International Committee for Animal Recording

ICAR Group Report

Date *of report*	2.06.2015	
SC/WG/TF/ *name*	Animal Identification	
Chair	Ken Evers/Kaivo Ilves	
Members *Name, organization, country and year joined, email contact*	1. Ken Evers, Department of Primary Industries Victoria, Australia, Joined 2009, Ken.Evers@nre.vic.gov.au 2. Jay Mattison. National Dairy Herd Improvement Association, USA, Joined 2004, jmattison@requestltd.com 3. Folkert Onken, Arbeitsgemeinschaft Deutscher Rinderzüchter, Germany, Joined 2007, olkert.onken@adt.de 4. Erik Rehben, Institute d'Elevage, France, Joined 2010, Erik.Rehben@inst-elevage.asso.fr 5. Henry Richardson, The Centre for Dairy Information, United Kingdom, Joined: 2002, henryrichardson@thecdi.co.uk 6. Kaivo Ilves, Eesti Põllumajandusloomade Jõudluskontrolli AS, Estonia, Joined: 2010, kaivo.ilves@epj.ee	
Members left	0	
Meeting(s) since May 2014	Last: Groß-Umstadt, November 20th, 21st	Next: Krakow, June 9th
Participation	Full: Kaivo Ilves Jay Mattison Juhani Maki-Hokkonen (ICAR) Susanne Gäckler (DLG) Pieter Hogewerf (IMA Wageningen)	Absence: Ken Evers Folkert Onken Erik Rehben Henry Richardson Ole Klejs Hansen (RYK)
Key agenda issues	Family testing Use of country codes Field sampling	
Important Decisions made since May 2014	ICAR Guidelines, Section 10 is updated New test protocol is introduced The new term ICAR certification with 5 year lifespan is introduced	
Active cooperation and links to other ICAR SC/WG/TFs and other international bodies such as ISO, EU, IDF, ISAG, world breed organisations, manufacturers etc	ISO TC23/SC19/WG3	
Issues to be handled by the Board & Deadlines	non	

Top 3 to 5 Issues for this SC/WG/TF	1. Family testing 2. Review the current test protocol 3. Approve the new test laboratory 4. Field sampling
How does this SC/WG fit into ICAR strategy?	”Improve the visibility of ICAR brand.” – ICAR approval for ID devices is well known in animal identification business. The aim is to imporve the image of ICAR brand „Improve international communication.“ – international communication (ISO, manufacturers, competent authorities) is part of the everyday work „Expands standards and guidelines to meet new technological developments“ and „Develop, update and maintain relevant technical guidelines and standards“ is SC for AI is working on.
In the chair’s opinion how can the Secretariat give greater assistance to the working of the SC/WG?	-
Finances – summary of any proposals that required ICAR funding. Objective and budget by year.	-

ICAR WGs, TFs and SCs Report

Date *of report*	May 2015
SC/WG/TF/ *name*	Interbull
Chair	Reinhard Reents
Members *Name, organization, country and year joined, email contact*	**Reinhard Reents** (Chairman) rreents@vit.de IT Solutions for Animal Production (vit w.V.) Heideweg 1, 27283 Verden / Aller, Germany **Brian Van Doormaal** vandoorm@cdn.ca Canadian Dairy Network 150 Research Lane, Suite 307, Guelph, N1G4T2, Ontario, Canada **Gert Pedersen Aamand** GAP@vfl.dk Nordisk Avelsvärdering Udkærsvej 15, Skejby,DK-8200 Århus N, Denmark **Daniel Abernethy** dabernethy@adhis.com.au Australian Dairy Herd Improvement Scheme Level 2 Swann House, 22 William St., Melbourne VIC 3000, Australia **Marjorie Faust** MFaust@absglobal.com ABS Global, Inc. P.O. Box 459, 1525 River Rd., DeForest, WI 53532, USA **Sophie Mattalia** sophie.mattalia@jouy.inra.fr France Génétique Élevage INRA-SGQA Domaine de Vilvert, 78352 JOUY en JOSAS cedex, FRANCE **Enrico Santus** enrico.santus@anarb.it Assoc. nazionale allev. bovini razza Bruna Loc. Ferlina, 204, 37012 Bussolengo (Verona), Italy **Marija Klopcic** Marija.Klopcic@bf.uni-lj.si University of Ljubljana Slovenia **Andrew Cromie** acromie@icbf.com Irish Cattle Breeding Federation (ICBF) Highfield House, ShinaghBandon, Co., Cork, Ireland **Erling Strandberg** (Secretary) Erling.strandberg@slu.se Department of Animal Breeding and Genetics, SLU Box 7023, 750 07 Uppsala, Sweden

<table>
<tr><td>Members left</td><td colspan="2"></td></tr>
<tr><td>Meeting(s) since June 2012</td><td><u>Last meetings:</u>
• Berlin, Germany, May 19 and 21, 2014
• Conference call, July 3rd, 2014
• Interbull Technical Workshop and Industry Meeting, Verden, Germany, February 23-25</td><td><u>Next meetings:</u>
• Orlando, USA, July 9 and 11, 2015</td></tr>
<tr><td>Participation</td><td>Full +: all members attended
Verden meeting: 75 participants in the technical workshop, and 90 participants in the industry meeting</td><td>Presentations from the Verden meeting:
http://www.interbull.org/ib/presentations_verden</td></tr>
<tr><td>Key Agenda Issues</td><td colspan="2">May 19 and 21, 2014
1. Opening
2. Adoption of agenda
3. Adoption of last SC minutes
4. Issues for discussion and decision:
a. ITC recommendations
b. Interbull Centre Annual report
c. SLU overhead/financial support to the Interbull Centre
d. Interbull Centre Financial report
e. Rules for bull control in GMACE
f. Genoex implementation proposal
g. Official adoption of GMACE
h. Adoption of sequential service calendar
5. General information issues:
a. Recruitments at the Interbull Centre
b. SLU/ICAR service agreement
c. SAC report
d. SC next conference call
7. Other Matters
8. Adjourn

July 3, 2014
1. Opening
2. Adoption of agenda
3. Adoption of last SC minutes
4. Issues for discussion and decision:
a. Response to the ICAR DNA WG
b. GENOEX follow up
c. Recruitments at the Interbull Centre
i. ICAR CEO vs. Interbull Centre Director
ii. Joint advertisement of Director and Geneticist</td></tr>
</table>

	iii. Transition plans 5. Other Matters 6. Adjourn
Important Decisions made since May 2014	Executive summaries of the Interbull SC main decisions have published and are available at: I. SC Executive Summary – June 2014 (https://wiki.interbull.org/public/2014_6_ExecSum)
Active cooperation and links to other ICAR SC/WG/TFs and other international bodies such as ISO, EU, IDF, ISAG, world breed organisations, manufacturers etc	• The Interbull Centre has been actively involved in EU legislation on breeding animals, given its status of European Union Reference Laboratory for Zootechnics • Active participation in parentage verification group of ICAR –> transition of microsatellites to SNP data • Active participation in establishment of a database for hosting of a parentage SNPs (GENOEX-PSE)
Issues to be handled by the Board & Deadlines	•
Top 3 to 5 Issues for this SC/WG/TF	Key strategic issues from the strategic plan (Jan. 2013): 1.World class genomic infrastructure and services for diverse customer needs 2.State-of-the-art classical genetic evaluation services 3.Business operations and image 4.Strategic communications and marketing 5.Network for research collaboration, quality assurance and best practice methods
How does this SC/WG fit into ICAR strategy?	Active part in supporting ICAR as setting worldwide Standards for genetic evaluation
In the chair's opinion how can the Secretariat give greater assistance to the working of the SC/WG?	• The support in general is good

International Committee for Animal Recording

ICAR Group Report

Date *of report*	25/5/2015	
SC/WG/TF/ *name*	MA SC (Milk Analysis SC)	
Chair	Gavin Scott	
Members *Name, organization, country and year joined, email contact*	1. Gavin Scott, MilkTestNZ, New Zealand,gavin@milktest.co.nz 2. Harrie Van Den Bijgaart, QLIP, Netherlands, bijgaart@qlip.nl, 3. Marina Gips, Israel Cattle Breeder Association, Israel, hmb-marina@icba.org.il 4. Philippe Trossat, ACTALIA Cecalait, France, ph.trossat@cecalait.fr 5. John Rhoads, ELS, USA, jrhoads@elsmilk.com 6. Thomas Hauck, Milchpruefring Bayern, Germany, thauck@mpr-bayern.de 7. Silvia Orlandini, Italy, sil.orlandini@outlook.it (membership under review as no longer employed by an ICAR organisation)	
Members left	2 members have left the group • Christian Baumgartner (DE) resigned as chairman and stepped down from the group, • Roberto Castaneda (AR) passed away	
Meeting(s) since May 2014	Last: Held at the IDF/ ISO analytical week in Namur Belgium April 2015	Next: IDF / ISO analytical week Copenhagen 2016 + conference call October 2015
Participation	Full: All but absent members	Absence: John Rhoads, Thomas Hauck
Key agenda issues	1. Geographic representation of members 2. Proficiency testing 3. IDF/ ISO validation protocol 4. AQAS	
Important Decisions made since May 2014	Little progress due to chair stepping down and waiting for direction from ICAR board.	
Active cooperation and links to other ICAR SC/WG/TFs and other international bodies such as ISO, EU, IDF, ISAG, world breed organisations, manufacturers etc	MA SC has good links into IDF / ISO with a number of members of the MA SC also active members of project groups and standing committees in the MAS (Methods of Analysis and Sampling) area of IDF.	
Issues to be handled by the Board & Deadlines	1. AQAS – set out parameters for the MA SC to work under. 2. Proficiency testing 3. Resourcing for AQAS / PT / etc….	
Top 3 to 5 Issues for this SC/WG/TF	1. AQAS 2. Proficiency testing 3. Validation of test equipment	
How does this SC/WG fit into ICAR strategy?	Extremely important that there is equivalence across milk testing laboratories (and also on farm devices)	

In the chair's opinion how can the Secretariat give greater assistance to the working of the SC/WG?	
Finances – summary of any proposals that required ICAR funding. Objective and budget by year.	

International Committee for Animal Recording

ICAR Group Report

Date *of report*	28 May 2015	
SC/WG/TF/ *name*	Recording and Sampling Devices Subcommittee	
Chair	Steven Sievert, National DHIA (US) sjsievert@dhia.org	
Members *Name, organization, country and year joined, email contact*	1. Clement Allain, Institut de l'Élevage (FR) clement.allain@inst-elevage.asso.fr 2. Richard Cantin, CanWest DHI (CA) rcantin@canwestdhi.com 3. Andrew Fear, LIC (NZ) afear@lic.co.nz 4. Manfred Hammel, LKVBB (DE) dr.hammel@lkvbb.de 5. Peter Huijsmans, KOM (NL) peter.huijsmans@stichtingkom.nl 6. Pascal Savary, ART (CH) pascal.savary@art.admin.ch	
Members left	Martin Burke (IE)	
Meeting(s) since May 2014	Last: 22 September 2014 (Conference Call)	Next: 9 June 2015
Participation	Full: Full	Absence:
Key agenda issues	• New ICAR test application and submittal form • ICAR website refresh for approved devices • Unapproved combinations of AMS and shuttle sampling devices • Length of approval on recording and sampling devices • Review and action on feedback from MO • Action on devices under test or completed testing • Carry-over task force activities	
Important Decisions made since May 2014	• Device approvals should move from a 'lifetime approval' as is currently occurring to a period of certification or approval with an expiry date and protocol for retesting and/or recertification • Development of proposed website layout for approved/certified recording devices that includes routine procedures, year approved, expiry, device, sampler, software version, and installation parameters. • Approval of expanded list of rigid mount weigh jars and moving previously noted provisional jars to approved listing. • Revision of test application form to remove ambiguities.	
Active cooperation and links to other ICAR SC/WG/TFs and other international bodies such as ISO, EU, IDF, ISAG, world breed organisations, manufacturers etc	The RSD-SC continues to work closely with recording device manufacturers and the three test centres on issues relevant to the recording industry including carryover reduction, device and sampler testing, and integration of new technologies.	
Issues to be handled by the Board & Deadlines	There are no immediate issues requiring board action at this time. The RSD-SC is drafting a proposal related to the length of approval for recording and sampling devices that may require review and input before the 2016 biennial session.	

Top 3 to 5 Issues for this SC/WG/TF	1. Guidelines, standards, testing and certification for tissue sampling devices 2. Guidelines, standards, testing and certification for animal weight recording devices. 3. Identification and testing of popular AMS milking systems with decoupled AMS samplers 4. Implementation of expiry periods for approval of recording devices along with testing/retesting requirements as needed 5. Update and expansion of the listing of approved recording devices on the ICAR website to include additional use parameters.
How does this SC/WG fit into ICAR strategy?	The RSD-SC continues align with ICAR strategy on multiple levels including: • Development and maintenance of relevant technical guidelines and standards. • Focus on international communication between MO, RD manufacturers, test centres, and other parties of interest. • Delivery of clear and consistent procedures, messages, and guidelines. • Work in an efficient and fair manner with consideration to both internal stakeholders and external interested parties. • Continually review and evaluate industry needs and expand focus area(s) to include new technologies and devices as appropriate.
In the chair's opinion how can the Secretariat give greater assistance to the working of the SC/WG?	As I am newly seated as the chair of the RSD-SC, I believe that I cannot answer this question objectively until after the ICAR 2015 meeting.
Finances – summary of any proposals that required ICAR funding. Objective and budget by year.	The three primary areas that may require resources or financial support from ICAR or Service-ICAR include: • Website redesign to include additional RSD parameters (already planned by ICAR) • Carry-over reduction testing in currently approved RSD • Testing of unapproved AMS-Shuttle combinations (to be reviewed at the next RSD-SC meeting with possibility of request for partial support)

International Committee for Animal Recording

ICAR Group Report

Date *of report*	31st May 2015	
SC/WG/TF/ *name*	Animal Care Recording	
Chair	Pierre-Louis GASTINEL (France Génétique Elevage –France)- 2013 Pierre-louis.gastinel@laposte.net	
Members *Name, organization, country and year joined, email contact*	• Elisabeth BERRY (DairyCo – UK; chair of IDF Standing Committee on animal health and animal welfare)- 2013 • Maria DEVANT GILLE (IRTA – Spain) - 2013 • Daniel LEFEBVRE (Valacta – Canada)- 2014 • Lindsay R. MATTHEWS (University of Münster – Germany)- 2014 • Luc MIRABITO (Institut de l'Elevage – France) -2013 • Olav OSTERAS (TINE- Norway, deputy chair of IDF Standing Committee on Animal Health and Welfare) - 2014 • Kathrin F. STOCK (vit – Germany)- 2013 • Alessia TONDO (AIA – Italy) - 2014	
Members left	At the end of 2014: Maria DEVANT GILLE and Pierre-Louis GASTINEL	
Meeting(s) since May 2014	Last: September 26th 2014	Next: No planned
Participation	Full:	Absence: Maria Devant
Key agenda issues	• presentations at international conferences to explain the potential contribution of genetic and recording organisations to improve animal welfare and its management • a cross analysis between the 11 principles of animal welfare described in the Terrestrial Code of World Organisation for Animal Health (OIE) and the practices of the recording organisations based on ICAR guidelines	

Important Decisions made since May 2014	1- **Presentations on two international conferences**: • The 6th International Conference on the Assessment of Animal Welfare at Farm and Group Level (WAFL 2014)(https://colloque6.inra.fr/wafl2014) • **T**he First DairyCare Conference 2014, Health and Welfare of Dairy Animals, an event organised by the COST Action DairyCare (http://www.dairycareaction.org), These presentations, by Pierre-Louis Gastinel at WAFL 2014 and Lindsay Matthews at DairyCare 2014, on the work of ICAR Animal Care Recording WG, gave a good demonstration of the potential contribution of genetic and recording organisations to improve animal welfare and its management. 2- With the collaboration of Christa EGGER-DANNER, chair of ICAR Functional Traits WG, ICAR Animal Care Recording WG produced **a report "Cross analysis"**, with answers to 3 questions: • Why is animal welfare important for ICAR members? • Are the ICAR Guidelines consistent with the principles of World Organisation for Animal Health (OIE) on animal welfare? • Which measures are necessary to assess the animal welfare indicators? Do these measures find a right place in ICAR Guidelines? The report gives **10 suggestions** for ICAR board and different SC and WG. 3- the Working Group on Animal Welfare Recording (AWR WG) was renamed in 2015 into **Animal Care Recording WG**
Active cooperation and links to other ICAR SC/WG/TFs and other international bodies such as ISO, EU, IDF, ISAG, world breed organisations, manufacturers etc	• Active cooperation with Functional Traits WG • Link with IDF, through E. Berry and O. Osteras • Regular informations from "IDF Standing Committee on Animal Health and Welfare » and « ISO/TC34/WG16 ».
Issues to be handled by the Board & Deadlines	10 suggestions are proposed in the report "Cross analysis". **Implementation of these suggestions have to be shared between Animal Care Recording WG and the other SC and WG.** The work has to be done in link with the ICAR contribution in the **Gene2Farm** project in which Enrico Santus is doing a cross analysis between the relevant traits "**to underpin sustainability and profitability of European cattle farming »** and the ICAR Guidelines.

Top 3 to 5 Issues for this SC/WG/TF	Among these 10 suggestions, top 3 issues are: • Clarity and ease of locating relevant sections of the ICAR recommendations for monitoring and improving animal health may be improved by **some restructuring and improved referencing / cross-linking** in future versions of the ICAR guidelines. • Guidelines for the recording of docility and temperament and possibly other behaviour traits should be elaborated • Recommendations on the recording of behaviour traits should be completed and possibly extended, with appropriate consideration of the **necessary concurrent recording of animal- based and resource-based data recording.**
How does this SC/WG fit into ICAR strategy?	The strategic plan of ICAR : • underlines the social impact of animal welfare requirements on the future of producers activities • Sets up the consideration of new traits as animal welfare among the main strategic goals.
In the chair's opinion how can the Secretariat give greater assistance to the working of the SC/WG?	• Appointment of a new chair of Animal Care Recording WG (ACR) • Sharing the work to be done, from the 10 suggestions, between ACR WG and the others WG or SC
Finances – summary of any proposals that required ICAR funding. Objective and budget by year.	To date, no proposal

International Committee for Animal Recording

ICAR Group Report

Date	27 May 2015	
SC/WG/TF/	Animal Data Exchange working group	
Chair	Erik Rehben	
Members *Name, organization, country and year joined, email contact*	**Members** : Abernethy Daniel, Australian Dairy Herd Improvement Scheme, Australia, dabernethy@adhis.com.au, 2010. Fourdraine Robert, AgSource, USA, rfourdraine@agsource.com, 2013 Frandsen Johannes, SEGES, Denmark, JHF@landscentret.dk, 2010. Pedarstaar Kalle, Estonian Animal Recording Center, Estonia, kalle.pedastsaar@jkkeskus.ee, 2011. Moore Robert, VALACTA, Canada rmoore@valacta.com, 2014 Rehben Erik, Institut de l'Elevage (IDELE), France, erik.rehben@idele.fr, Van't Land Bert, CRV, The Netherlands, Bert.van.t.Land@crv4all.com, 2010. Werner Andreas, LKV Baden Wurttemberg, Germany, awerner@lkvbw.de, 2010. **Observers**: Goldmann Juergen, DLG, Germany, J.Goldmann@dlg.org, 2012 Van Diepen Frans, UNCEFACT / Dutch ministry of Agriculture, The Netherlands, f.van.diepen@minlnv.nl, 2010.	
Members left	0	
Meeting(s) since May 2014	Last: Face to face: November 2014 February 2015 March 2015 with Nordic countries Conference call September 2014 (1) October 2014 (x2) November 2014 (x2) December 2014 (x2) January 2015 (x2) February 2015 (1) March 2015 (x2) April 2015 (x2) May 2014 (x2)	Next: Conference call: June 2015 Face to face: June 2015
Participation	High +: apart oversea member	Absence:
Key agenda issues	Complementing with pilot tests as proof of concept. Delivering the specifications. Implementing a maintenance process based on certification fees in order to keep the standard alive. Foster an early adopter group.	

Important Decisions made since May 2014	Developing the specifications of an operational system. Designing a process, for certification and maintenance process and a business model to keep the ADE standards alive. Fostering an early adopter group. Schedule and resources to achieve the above objectives.
Active cooperation and links to other ICAR SC/WG/TFs and other international bodies such as ISO, EU, IDF, ISAG, world breed organisations, manufacturers etc	UNCEFACT (United Nations Center For Trade Facilitation and Electronic Business) about the re use of some elements of this standard. ISO BUS: preliminary contacts to foster the manufacturer interest and to learn from their methodology. Manufacturers: • Delaval, • Lely, • Fullwood, • GEA.
Issues to be handled by the Board & Deadlines	1. **By the end of August**: amending and endorsing the specifications as well as the principle of an open and free dissemination through a specialized section of the ICAR web site complementary to the guideline which would deal only with the basic principles. 2. **By the end of November**: amending and endorsing the maintenance process, the certification principles as well as the business model to keep the standards alive. 3. **By the end of June:** endorsing the principles to be discussed by the early adopter group.
Top 3 to 5 Issues for this SC/WG/TF	1. Fostering the establishment of an early adopter group to enhance the profitability of the investments of all the stakeholders in data exchange: manufacturers, milk recording organizations… 2. Implementing a maintenance process as well as the certification with its business model to keep the ADE standard alive. 3. Increasing the awareness of ADE standards. 4. Defining the limits of the functional and the technical diversity that must not be exceeded not to jeopardize the profitability of stakeholder investment in data exchange.
How does this SC/WG fit into ICAR strategy?	Contribute to : 1. Link with the SC for recording devices 2. Adress practical problems for data transfer 3. Establish models for data validation Facilitate interfaces with milkmeters
In the chair's opinion how can the Secretariat give greater assistance to the working of the SC/WG?	The secretariat provides the WG with a valuable support when it is required.
Finances – summary of any proposals that required ICAR funding. Objective and budget by year.	None

International Committee for Animal Recording

ICAR Group Report

Date *of report*	25 May 2014	
SC/WG/TF/ *name*	Animal Fibre WG (AFWG)	
Chair	Marco Antonini	
Members *Name, organization, country and year joined, email contact*	– *Marco ANTONINI (Italy) ENEA 2007 - marco.antonini@enea.it* – *LOU Yujie (China) Jilin Agricultural University – 2007 - louyujie2003@yahoo.com.cn* – *Claudio TONIN (Italy) CNR Italian National Research Council – 2007 - c.tonin@bi.ismac.cnr.it* – *Hugh GALBRAITH (United Kingdom) University of Aberdeen – 2007 - h.galbraith@abdn.ac.uk* – *Oscar TORO (Peru) Ong DESCO – 2007 otoro@descosur.org.pe (cpachecomg@gmail.com)* – *David BARBOZA* (USA) *Alpaca Owners and Breeders Association (AOBA) – 2009 -* Ranchonc@hughes.net – *Rodolfo MARQUINA BERNEDO (Peru) Ong DESCO – 2011 arequipa@descosur.org.pe* – *Suzan TELLEZ (USA) Resource Computing – 2011 - sztellez@aol.com* – *Wenguang ZHANG (China) College of Animal Science, Inner Mongolia Agricultural University – 2012 – atcgnmbi@yahoo.com.cn* – *Juan Pablo GUTIERREZ (Spain) Dpt. of Animal Production, Veterinary Faculty, University Complutense of Madrid – 2012 – gutgar@vet.ucm.es* – *Wenxin ZHENG* (China) *Xinjiang Academy of Animal Science, 151 Kelamay East Street - Urumqi, Xinjiang 830000 – 2014 - zwx2020@126.com*	
Members left	0	
Meeting(s) since May 2014	Last: Informal meeting held in Urumqi – China on 12 – 18 October 2014	Next:
Participation	Full: prof. *Wenguang ZHANG* prof. *Yujie* LOU dr. *Wenxin ZHENG*	Absence:
Key agenda issues	Definition of new Guidelines for the cashmere production	
Important Decisions made since May 2014	The specific subgroup on cashmere production defined two new guidelines on cashmere production: Guidelines for cashmere combing management, fibre harvesting and grading and ICAR rules, standards and guidelines on methods of cashmere goat identification. The subgroup opens a discussion on the possibility to organize some Collection Centre for cashmere fibre in China. Other proposal was the organization of a network of Lab worldwide, for the cashmere lots certification managed in the Collection Centre.	

Active cooperation and links to other ICAR SC/WG/TFs and other international bodies such as ISO, EU, IDF, ISAG, world breed organisations, manufacturers etc	At the moment no cooperation and links have been activated.
Issues to be handled by the Board & Deadlines	
Top 3 to 5 Issues for this SC/WG/TF	1. define the guide of the objective parameters to differentiate Suri and Huacaya fibre; 2. produce the guideline on objectives and criteria of Alpaca selection. 3. Application of the new guideline for cashmere goat fibre production worldwide. 4. Involvement of International Bodies for animal fibre analysis and certification.
How does this SC/WG fit into ICAR strategy?	
In the chair's opinion how can the Secretariat give greater assistance to the working of the SC/WG?	The AFWG needs a support to define and apply an ICAR Strategy for: the organization of Cashmere Collection Centre and the organization of International Lab for cashmere lots certification. The goal could be to apply ICAR Label in the cashmere lots managed according to the ICAR Guideline
Finances – summary of any proposals that required ICAR funding. Objective and budget by year.	

International Committee for Animal Recording

ICAR Group Report

Date *of report*	June 1, 2015	
SC/WG/TF/ *name*	AI and other Relevant Technologies WG	
Chair	Gordon A. Doak	
Members *Name, organization, country and year joined, email contact*	1. No changes	
Members left	0	
Meeting(s) since May 2014	Last: None	Next:
Participation	Full:	Absence:
Key agenda issues		
Important Decisions made since May 2014	None	
Active cooperation and links to other ICAR SC/WG/TFs and other international bodies such as ISO, EU, IDF, ISAG, world breed organisations, manufacturers etc		
Issues to be handled by the Board & Deadlines		
Top 3 to 5 Issues for this SC/WG/TF	1. Review and clean up bar code issues for the guidelines 2. Present examples on NAAB's and ICAR's web sites description of straw printing (including the structure of bar coding)	
How does this SC/WG fit into ICAR strategy?		
In the chair's opinion how can the Secretariat give greater assistance to the working of the SC/WG?		
Finances – summary of any proposals that required ICAR funding. Objective and budget by year.	None at this time	

International Committee for Animal Recording

ICAR Group Report

Date *of report*	24 May 2015	
SC/WG/TF/ *name*	Conformation	
Chair	Gerben de Jong CRV Netherlands Gerben.de.Jong@crv4all.com	
Members *Name, organization, country and year joined, email contact*	László Bognár Holstein Hungary Hungary bognar@holstein.hu Gabriel Blanco CONAFE Spain gabriel.blanco@conafe.es Bethany Muir Holstein Canada Canada bmuir@holstein.ca	
Members left	1 : Lucy Andrews	
Meeting(s) since May 2014	Last: September 2014	Next: May 2015 in Krakow
Participation	Full: yes	Absence:
Key agenda issues	Determine list conformation traits in beef breed Inform all dairy and dual purpose breed organisation on the recommendations for conformation in dairy breeds. Add one or two persons from beef breeds to the WG	
Important Decisions made since May 2014	Send recommendations to ICAR board on conformation traits in beef breeds	
Active cooperation and links to other ICAR SC/WG/TFs and other international bodies such as ISO, EU, IDF, ISAG, world breed organisations, manufacturers etc	Interbeef WG on goat performance recording	
Issues to be handled by the Board & Deadlines	Approval of the recommendations on conformation traits in beef breeds during Krakow meeting, May 2015	
Top 3 to 5 Issues for this SC/WG/TF	1. Start a survey among goat organisations on conformation scoring. 2. Make conformation standards appropriate to all breeds.	
How does this SC/WG fit into ICAR strategy?		
In the chair's opinion how can the Secretariat give greater assistance to the working of the SC/WG?		
Finances – summary of any proposals that required ICAR funding. Objective and budget by year.		

International Committee for Animal Recording

ICAR Group Report

Date *of report*	25/5/2015				
SC/WG/TF/ *name*	WG Dairy Cattle Milk Recording				
Chair	In August 2014, Pavel Bucek replaced Hans Wilmink, who became the new ICAR president.				
Members *Name, organization, country and year joined, email contact*	**Kai Kuwan**	Germany	VIT	2013	kai.kuwan@vit.de
	Karl Zottl	Austria	LKV Austria	2014	karl.zottl@lkv-service.at
	Hélène Leclerc	France	IDELE	2012	helene.leclerc@jouy.inra.fr
	Pavel Bucek	CZ	CMBC	2012	bucek@cmsch.cz
	Yaniv Lavon	Israel	ICBA	2014	yaniv@icba.co.il
	Filippo Miglior	Canada	CDN	2012	miglior@cdn.ca
	Juho Kyntäjä (New member in 2014)	Finland	Agricultural Data Processing Centre	2014	juho.kyntaja@mloy.fi
	Kevin Haase	USA	Northstar Cooperative Inc	2013	haaseK@nscooperative.com
	Carlos Trejo	Chile	COOPRINSEM	2012	ctj@cooprinsem.cl
	Japie van der Westhuizen	South Africa	SA Studbook	2012	japie@studbook.co.za
Members left	Pavel Bucek replaced Hans Wilmink as the new chairman in August 2014. Yaniv Lavon replaced Ephraim Ezra in October 2014.				
Meeting(s) since May 2014	**24.6. 2014** videoconference with all working group members. Last meeting with Hans Wilmink. **23.9.2014** videoconference with all working group members. Meeting chaired by Pavel Bucek. **Ad hoc group** videoconferences focusing on the survey and ICAR Guidelines: Pavel Bucek, Karl Zottl and Juho Kyntäjä 24.10.2014, 26.10.2014, 30.10.2014 **Meeting in Prague on 11th and 12th November 2014** (ad hoc group: Pavel Bucek, Karl Zottl and Juho Kyntäjä): Survey and preparation of the guidelines.				**Forthcoming:** • June 2015 (ICAR Technical Workshop in Poland). • Working Group Meeting in Rome scheduled for late 2015 or early 2016 for all Dairy Cattle Milk Recording Working Group members. • Regular videoconference and/or phone conference with all working group members. • Extra meetings for members responsible for specific projects and/or ad hoc groups if necessary.

Meeting(s) since May 2014	**21.11.2014** WebEx (ad hoc group: Pavel Bucek, Karl Zottl and Juho Kyntäjä): Signed off on the final version of the survey before distribution. **11th December 2014** videoconference with all working group members. **21st to 23rd January 2015** Meeting in Vienna (ad hoc group: Pavel Bucek, Karl Zottl and Juho Kyntäjä): Focus on the survey. **Ad hoc group** videoconferences focusing on the survey and ICAR Guidelines: Pavel Bucek, Karl Zottl and Juho Kyntäjä 27.1.2015, 5.2. 2015 **12th February 2015** Videoconference with all working group members. **Ad hoc group meeting** focusing on the survey and ICAR Guidelines): Pavel Bucek, Karl Zottl and Juho Kyntäjä 28.1., 5.2., 3.3., 31.3., 17.3. 2015 **14th and 15th April 2015.** Meeting in Finland focusing on the survey and Guidelines (ad hoc group: Pavel Bucek, Karl Zottl and Juho Kyntäjä) **21st April 2015** Phone conference with all working group members **12th May 2015** Videoconference finalising the survey papers (ad hoc group: Pavel Bucek, Karl Zottl and Juho Kyntäjä).	

Participation	Full: Participation was high. Since the meeting on 23rd September 2014, on average only 1 from a total of 10 members was absent. The most absentees for any one meeting were 3.	Absence:
Key agenda issues	**1. Preparation of the new version of the ICAR Guidelines (Section 2 of the ICAR Guidelines)** including revision and updating of the current version and implementing of new parts of ICAR Guidelines – Section 2. The goal is to finish before Chile 2016 and include this new version in the new edition of the ICAR Guidelines. **2. Survey: World Trends in Cattle Milk Recording in three parts (questionnaire with 106 questions covering all relevant parts of Section 2 of the ICAR Guidelines):** • Worldwide Trends in Cattle Milk Recording • Worldwide Trends in Milk Recording: Milk Recording and New Technologies • Worldwide Trends in Milk-Recording Management and Organisation Scope of the project: • Dairy cows covered in the questionnaire: 21,486,116 • Number of recording organisations: 287 • Number of milk-analysis laboratories: 169 • Number of organisations that completed the questionnaire: 46 (including ICAR members and non-members from around the world). Results of the project: 3 papers for the ICAR Technical Workshop in Poland, brochure with all results of the project and derived indicators. Results will be used to improve the ICAR Guidelines. Some of the results will be available in other languages (in Arabic, Russian, etc.). It is expected that the results will be published in a scientific magazine, most probably the Journal of Dairy Science. **3. Organise Technical Session IV during the next ICAR Technical Workshop in Poland in June 2015:** Milk recording for cattle, meat and fibre performance in sheep, goats and beef cattle, which is scheduled for Thursday, 11th June 2015 from 08:00 to 10:00 and chaired by Pavel Bucek and Laurent Journaux. **4. Planning of future activities and projects.**	

Important Decisions made since May 2014	1. To organise Technical Session IV at the ICAR Technical Workshop in Poland. 2. To organise a session on cattle milk-recording in Chile (already approved by the organisers in Chile). 3. Discussion of future projects and activities (this discussion is in progress and will be finalised during the ICAR meeting in Poland or via videoconference in September 2015). Plan for 2016 may be adapted or changed: • The AfiLab project will focus on the possibility of implementing in-line analysis for milk recording, including statistical analysis, technical aspects and other relevant details (Yaniv Lavon from the Dairy Cattle Milk Recording Working Group and Ephraim Ezra will be responsible for the project). • A project will focus on daily milk recording with data from Finland. Statistical analysis will be a crucial part of the project. There will be discussion on how to implement this approach and on related specific problems and issues. • Project plausibility checks in cattle milk recording. • South American project on specific aspects of cattle milk recording in South America. This project also should aim at solving the specific problems and barriers faced by countries in this area.
Active cooperation and links to other ICAR SC/WG/TFs and other international bodies such as ISO, EU, IDF, ISAG, world breed organisations, manufacturers etc	1. ICAR Certificate of Quality: revision of current rules for the ICAR Certificate of Quality (in collaboration with Charl Hunlun) Pavel Bucek is a convenor of the focus group on milk recording. These rules were also discussed and reviewed with some members of the Dairy Cattle Milk Recording Working Group. The activities have been addressed at ICAR working groups, where members from other working groups were in attendance: Aire Pentjärv (Developing Countries Working Group) and Jean-Michel Astruc (Performance Recording of Dairy Sheep Working Group) Focus Group on Milk Recording (including Milk Recording for Buffalo, Sheep and Goats) Convenor: Pavel Bucek Members: Aire Pentjärv, Japie van der Westhuizen, Drago Kompan Material discussion and input from: Juho Kyntäjä, Karl Zottl, Jean-Michel Astruc and the ICAR Dairy Cattle Milk Recording Group 2. Collaboration with Andreas Werner from the Animal Data Exchange Working Group. 3. Advising and solving specific problems among ICAR member organisations. Advisory service offered in Poland and Lithuania. Visit of Yaniv Lavon to China, who advised on ways to improve cattle milk recording in China. 4. Collaboration with Josef Kucera, President of the World Simmental-Fleckvieh Federation and President of the European Simmental-Fleckvieh Federation. 5. Promotion of the working group in Finland. Presentation on the working group and project results in Finland (Pavel Bucek). Agricultural Data Processing Centre, Finland 6. In the later stages of preparation for the new version of the ICAR Guidelines we are planning to collaborate with external reviewers (from among other ICAR working groups and selected experts).

Issues to be handled by the Board & Deadlines	Not at this stage
Top 3 to 5 Issues for this SC/WG/TF	1. Continue work on the new version of the ICAR Guidelines, Section 2. 2. Have a session on the ICAR Technical Workshop at the Technical Workshop in Poland. 3. Have a session on the ICAR meeting at the ICAR 40th Biennial Session in Chile 2016. 4. Survey on World Trends in Milk Recording in Cattle.
How does this SC/WG fit into ICAR strategy?	Completely Developing and updating the ICAR Guidelines is a core activity for ICAR. The survey includes monitoring of the current situation in milk recording and the organisation of milk recording and trends in methodology and management in milk-recording organisations, improvement of the ICAR Guidelines and strengthening communication with ICAR members in order to obtain useful comparisons of methodologies, protocols and practices. It also serves as a starting point for continuing progress among milk-recording organisations. These points are essential for ICAR strategy in the future. Improve the visibility of ICAR among ICAR non-member countries and promote ICAR activities in these countries (e.g. Iceland, Colombia, etc.).
In the chair's opinion how can the Secretariat give greater assistance to the working of the SC/WG?	We received a lot of help from Cesare, who prepared the excellent technical facilities for our videoconferences. Cesare and the ICAR Secretariat provide ideal conditions for our work and we are very impressed with the quality of their service. We would like to thank all our colleagues in the ICAR Secretariat for their support and for their excellent work.
Finances – summary of any proposals that required ICAR funding. Objective and budget by year.	Not at this stage

ICAR Group Report

Date *of report*	03/06/2014	
SC/WG/TF/ *name*	Working Group for Developing Countries	
Chair	Badi Besbes	
Members *Name, organization, country and year joined, email contact*	Aire Pentjärv, Estonian Animal Recording Centre, aire.pentjarv@jkkeskus.ee Beatrice Balvey, Institut de l'élevage, France, Beatrice.Balvay@inst-elevage.asso.fr Cuthbert Banga, Agricultural Research Council, South Africa, cuthbert@arc.agric.za Jorge Lama González, COOPRINSEM, Chile, jlama@cooprinsem.cl Kamlesh R Trivedi, National Dairy Development Board, India, krt@nddb.coop Omrane Ben Jamaa, Office de l'Elevage et des Paturages, Tunisia, omranebenjamaa@gmail.com	
Members left	1 (Omrane Ben Jamaa has left OEP and should be replaced)	
Meeting(s) since May 2014	Last: no meeting of the WG as such, but 3 members met and had several Skype meetings	Next: not fixed
Participation	3 members	Absence:
Key Agenda Issues	Information about ICAR board meetings and decisions; Organization of the Pretoria Symposium.	
Important Decisions made since May 2014	Organization of the symposium on Animal identification and recording (AIR) systems for traceability and livestock development in sub-Saharan Africa, 14-16 April 2015, Pretoria, South Africa	
Active cooperation and links to other ICAR SC/WG/TFs and other international bodies such as ISO, EU, IDF, ISAG, world breed organisations, manufacturers etc	Members of other SC and WG actively participated in the Symposium, as well international and regional organisations (AU-IBAR, OIE, ILRI). Approximately 130 high-level delegates form 30 countries attended the Symposium. At the end of the Symposium, a Pretoria Declaration on Animal Identification and Recording Systems for Traceability and Livestock Development http://www.fao.org/fileadmin/templates/raf/pdfFiles/AIR_Pretoria_Declaration.pdf was adopted. It concludes that livestock identification and recording are vital for food security and safety, genetic improvement and better flock management (see press release http://www.fao.org/africa/news/detail-news/en/c/284638/). The event was sponsored by 8 manufacturers. See http://www.icar.org/Documents/Pretoria_2015/Pictures/index.htm for more information on the symposium	
Issues to be handled by the Board & Deadlines	None	

Top 3 to 5 Issues for this SC/WG/TF	a. Produce, publish and widely distribute the Proceedings of the Symposium. b. Produce a synthetic document with simplified modalities for Dairy production recording (section 2 of ICAR guidelines). A last year objective that is still valid. c. Work towards forming a regional networks (starting in Africa) and promote ICAR activities in the respective region of WG members. d. Prepare a session (or side event) targeting small scale livestock production during the 2016 ICAR meeting in Chile. (Jorge what do you think? Any other idea is very welcome)
How does this SC/WG fit into ICAR strategy?	This WG promotes the development of animal identification and recording, including traceability, in developing countries, with focus on small scale livestock producers. The workshops organized, with the support of the FAO, contribute to raise awareness of key stakeholders. Some of them are potential future members of ICAR.
In the chair's opinion how can the Secretariat give greater assistance to the working of the SC/WG?	???????
Finances – summary of any proposals that required ICAR funding. Objective and budget by year.	Targeted communication and if possible physical meeting (workshop) in (East) Africa to keep the momentum and build on the results of the Pretoria Symposium. Objective: Establish cooperation with regional organisations in Africa

International Committee for Animal Recording

ICAR Group Report

Date *of report*	28/5/2015	
SC/WG/TF/ *name*	ICAR Working Group on Functional Traits	
Chair	Christa Egger-Danner	
Members *Name, organization, country and year joined, email contact*	• Andrew John Bradley, Quality Milk Management Services, United Kingdom (joined 2010); andrew.bradley@qmms.co.uk • John B. Cole, Animal Improvement Programs Laboratory, ARS, USDA, USA (joined 2010); John.Cole@ARS.USDA.GOV • Nicholas Gengler, Gembloux Agricultural University, Belgium (original member); nicolas.gengler@ulg.ac.be • Bjorg Heringstad, Department of Animal and Aquacultural Sciences / Geno , Norwegian University of Life Sciences, Norway (joined 2012); bjorg.heringstad@nmbu.no • Jennie E. Pryce, *Department of Environment and Primary Industries and La Trobe University, Agribio*, Australia (joined 2006); jennie.pryce@depi.vic.gov.au • Kathrin F. Stock, Vereinigte Informationssysteme Tierhaltung w.V. (vit), Germany (joined 2010); Friederike.Katharina.Stock@vit.de	
Members left	1 (Lucy Andrews, UK)	
Meeting(s) since May 2014	Last: 9 (2 physical meetings; 7 online meetings	Next: Krakow, 9th of June 2015
Participation	Mainly meetings together with international claw health experts	Absence:
Key agenda issues	• Standardisation of Claw Health Data (achieved) • ANIMAL paper: Invited review: Overview of new traits and phenotyping strategies in dairy cattle with a focus on functional trait (published) • Preparation of publication on the “Guidelines on Health Data Recording” in an international known journal (in progress) • Update of Guideline on Udder Health (in progress) • Cooperation with other organisations	
Important Decisions made since May 2014	• Special ICAR publication on the international standardisation of foot and claw disorders (ICAR claw health atlas).	

Active cooperation and links to other ICAR SC/WG/TFs and other international bodies such as ISO, EU, IDF, ISAG, world breed organisations, manufacturers etc	International experts on claw health: cooperation within standardisation of foot and claw disorders (ICAR Claw Health Atlas) Cooperation with project SSynCAHD: Kathrin Stock participated in a workshop in Ghent, 27th of March 2015 on "Standardising Syndromic Classification in Animal Health Data". The aim of the SSynCARD project is (Workshop report Ghent 20150327): As discussed in the first project workshop, and reviewed in this workshop, an ontology will be developed by the SSynCAHD project, according to the following competency goals: • *Ontology domain: veterinary syndromic surveillance* • *To describe the terms and relations necessary to detect the occurrence of animal health events of interest for surveillance though recorded animal health data.* • *To allow standardisation of syndromic classification of animal health data without the need for common coding practices, acknowledging the differences in data recording practices across animal health domains, institutions and countries.* • *To be freely available* • *Built by the veterinary syndromic surveillance community and maintained by a group of curators* Cooperation with ICAR WG Animal Welfare Recording: Kathrin Stock is member in both working groups and providing the link. Cooperation with IDF: A meeting between the ICAR WGFT and IDF was conducted in Berlin 20th of May 2014. The following was agreed: *The Deputy Chair of the IDF Standing Committee of Animal Health and Welfare, Dr. Olav Osteras, will represent IDF as permanent observer at the ICAR WGFT. Information between the ICAR WGFT and IDF Standing Committee of Animal Health and Welfare will be exchanged. Further possibilities of cooperation will be identified in future.* No further activities have been undertaken so far. Cooperation with Gene2Farm: In 2014 a meeting in Berlin with Andrea Rosatti, Enrico Santos and Brian Wickham was conducted. Information about the present status of work of the ICAR WGFT was provided to Gene2Farm. The link between ICAR WGFT and Gene2Farm is also based on the fact that Christa Egger-Danner is working for ZuchtData and ZuchtData is SME partner of Gene2Farm project. Link to with other projects: MIR (Gengler), Efficiency/Methan (Pryce),..
Issues to be handled by the Board & Deadlines	Approval of ICAR Claw Health Atlas ICAR Claw Health Atlas**:** For the first time internationally agreed and standardized descriptions of foot and claw disorders are becoming available. It would be important that this ICAR Claw Health Atlas could be also promoted to be recognized outside of ICAR by other international organisations (FAO, EFSA,..) Visibility of guidelines: Presently it is still difficult to find the ICAR guidelines, especially for external organisations. An attractive and clearly structured website would help to promote the activities of ICAR. When searching ICAR publications, preliminary versions ('submitted for approval') are more likely to be found than the final, officially published guidelines. This provokes erroneous citations or complete ignorance of this source of information (implying negative impact on the visibility of ICAR).

Top 3 to 5 Issues for this SC/WG/TF	• Claw health recording – promotion of ICAR Claw Health Atlas outside of ICAR • Udder health – Update of guideline • Publication of results of ICAR WGFT (Guideline on Health, Claw Health,..)
How does this SC/WG fit into ICAR strategy?	Functionality aspects are gaining more and more interest internationally, particularly in the context of using new phenotypes in breeding. More and more activities are coming up and therefore standardisation of functional traits and providing of guidelines can support this development.
In the chair's opinion how can the Secretariat give greater assistance to the working of the SC/WG?	The ICAR secretariat is very helpful and supportive. Thank you.
Finances – summary of any proposals that required ICAR funding. Objective and budget by year.	ICAR Claw Health Atlas – publication: limited number of printed issues (would be nice if each author and contributor of the ICAR Claw Health Atlas would receive a few printed copies (maybe 5) together with an official letter from ICAR to thank them) – payment of the costs need to be discussed Optional: the idea exists that in connection with the next ICAR meeting or (preferably) another international meeting a workshop on claw health recording could be organised. The ICAR WGFT is ready to organise the programme and contact the experts for giving talks, but otherwise assistance would be needed.

International Committee for Animal Recording

ICAR Group Report

Date *of report*	27 May 2015	
SC/WG/TF/ *name*	DNA Working Group	
Chair	Wim van Haeringen	
Members *Name, organization, country and year joined, email contact*	Marco Winters, TBA Romy Morrin-O'Donnell, Weatherbys, Ireland. Raffaella Mazza, Associazione Italiana Allevatori, Italy. Bianca Lind, TBA Andre Eggen, Illumina Brian Wickham, Agendamember	
Members left	0	
Meeting(s) since May 2014	Last: 31 March 2015	Next: ICAR meeting
Participation	Full: Yes, most of the time.	Absence: Rarely
Key agenda issues	Accreditation of labs Accreditation developments Standardization of exchange, e.g. GENOEX	
Important Decisions made since May 2014	Several labs were accredited, successful rounds of accreditation done. GENOEX involvement	
Active cooperation and links to other ICAR SC/WG/TFs and other international bodies such as ISO, EU, IDF, ISAG, world breed organisations, manufacturers etc	Clear link to Parentage WG. Logical interaction with ISAG re marker panels.	
Issues to be handled by the Board & Deadlines	GENOEX policy regarding access of data and need for requirements before uploading data into storage.	
Top 3 to 5 Issues for this SC/WG/TF	1. Accreditation of labs 2. Accreditation developments 3. Standardization of exchange, e.g. GENOEX	
How does this SC/WG fit into ICAR strategy?	Part of QA / QC regarding (future) requirements of DNA tests / genotypes.	
In the chair's opinion how can the Secretariat give greater assistance to the working of the SC/WG?	None, the secretariat is accommodating our needs perfectly.	

Finances – summary of any proposals that required ICAR funding. Objective and budget by year.	None at the moment, but the GENOEX may require a dedicated meeting.

International Committee for Animal Recording

ICAR Group Report

Date *of report*	25 May 2015	
SC/WG/TF/ *name*	Goat Performance Recording Working Group	
Chair	Zdravko Barać, Croatian Agricultural Agency (Croatia), since 2004	
Members *Name, organization, country and year joined, email contact*	1. Jean-Michel Astruc, INRA Toulouse, (France), since 2004 2. Silverio Grande, Italian Breeders' Association (Italy), since 2012, 3. Pierre van Rooyen, South African Stud Book and Livestock Improvement Association (South Africa), since 2012 4. Juan Manuel Serradilla Manrique, University of Cordoba (Spain), since 2012 5. Drago Kompan, University of Ljubljana, (Slovenia), since 2004	
Members left	0	
Meeting(s) since May 2014	Last: None in given period. The last was in May 2014 – joint meeting with Performance recording of dairy sheep WG	Next: Krakow, 18th June 2015 - joint meeting with Performance recording of dairy sheep WG
Participation	Full: The meeting was open to non-members of the working groups. Twenty-one persons attended the meeting.	Absence:
Key agenda issues	Harmonization of the Guidelines for goat milk recording	
Important Decisions made since May 2014	1. Section 2.3. "ICAR rules, standards and guidelines for milk recording in goats" have been reviewed, and material containing suggested changes was distributed among WG members (and also among members of Performance recording of dairy sheep WG). After final comments, the material sent to ICAR secretariat for further procedure. 2. On line survey on goat milk recording – It is proposed new structure of tables, and possibility for enter new data is included.	
Active cooperation and links to other ICAR SC/WG/TFs and other international bodies such as ISO, EU, IDF, ISAG, world breed organisations, manufacturers etc	1. The group has active collaboration with Performance recording of dairy sheep WG, with which shares similar issues. After a joint meeting in Berlin, we will hold a joint meeting in Krakow. 2. The group has started collaboration with Conformation Working Group to prepare recommendations for conformation traits in goat breeds.	
Issues to be handled by the Board & Deadlines	-	

Top 3 to 5 Issues for this SC/WG/TF	1. Harmonisation of the guidelines for milk recording 2. “On line” database on milk recording 3. Standards for meat recording in goats 4. Standards for non-milking traits in goats 5. Recommendations for conformation traits in goat breeds
How does this SC/WG fit into ICAR strategy?	The interest for goat keeping and goat milk production is increasing. There is a need for widening of milk recording practices to the countries where this production is at its beginnings. Also, meat breeds recording is in use or planned to be in use soon in some member countries, which implies preparation of meat recording guidelines. The WG should continue with planned activities.
In the chair’s opinion how can the Secretariat give greater assistance to the working of the SC/WG?	The Secretariat gives all necessary support for the activities of the WG.
Finances – summary of any proposals that required ICAR funding. Objective and budget by year.	Currently, activities of the WG do not require funding.

International Committee for Animal Recording

ICAR Group Report

Date *of report*	4th June 2015	
SC/WG/TF/ *name*	Interbeef.	
Chair	Andrew Cromie	
Members *Name, organization, country and year joined, email contact*	1. Andrew Cromie, ICBF, Ireland, acromie@icbf.com 2. Friedrich Reinhardt, VIT, Germany, friedrich.reinhardt@vit.de. 3. Japie van der Westhuizen, SA Studbook, South Africa, japie@studbook.co.za 4. Mike Coffey, SRUC, Scotland, Mike.Coffey@sruc.ac.uk 5. Rob Banks, University New England, Armidale, Australia, rbanks@une.edu.au 6. Mauro Fioretti, Association Italian Beef Breeds, Italy, Fioretti.m@aia.it. 7. Pavel Bucek, Czech Moravian Breeders´ Corporation, Inc, Czech Republic, 2010, bucek@cmsch.cz 8. Anders Fogh, Knowledge Centre for Agriculture, Denmark, ADF@vfl.dk 9. Laurent Griffon, Idele, France, 2010, Laurent.Griffon@idele.fr	
Members left	Clara Diaz, INIA, Spain. Joao Durr, Interbull, Sweden.	
Meeting(s) since May 2014	Last: 26 November 2014, Dublin. Five conference calls involving a sub-group overseeing development of genetic evaluations for weaning weight.	Next: 9th June 2015, Krakow
Participation	Full: 6	Absence: 3 (with apologies).
Key agenda issues	• Development and implementation of official genetic evaluations for weaning weight (direct and maternal) for Limousin and Charolais breeds. • Development of genetic evaluations for other key profit traits in beef cattle, notably; (i) calving performance, (ii) female fertility and (iii) carcass traits. We expect these traits to be officially rolled out over next ~18 months. • Undertaking other relevant research focused on the development of more accurate international evaluations for beef cattle, e.g., use of cross-bred data in genetic evaluations. • Hosting of a beef genomics workshop in Dublin on 24 & 25 November for members. Some 80 people were in attendance. Key actions/outcomes from that meeting were; o Facilitate the sharing of a list of genotyped animals amongst members. o Establish a genotypes database for sharing genotypes for various services, including parentage/ verification/discovery, imputation and genomic evaluations.	
Important Decisions made since May 2014	• Decision to launch first official genetic evaluations for weaning weight (direct and maternal) for Limousin and Charolaois breeds.	

Active cooperation and links to other ICAR SC/WG/TFs and other international bodies such as ISO, EU, IDF, ISAG, world breed organisations, manufacturers etc	• Participated in a cross-functional ICAR team to help develop a Genotype Exchange - Parentage SNP Exchange (GenoEx PSE) service for ICAR members. The proposition is currently being considered by ICAR board. • Initiated discussions with Australia (AGBU, ABRI and MLA) re: potential participation in ICAR/Interbeef in the future. Australia will be formally represented at the forthcoming Interbeef meeting in Krakow, where opportunities for collaboration will be discussed/explored with the Interbeef Working Group.
Issues to be handled by the Board & Deadlines	• Development and launch of the GenoEx PSE service. Strong support for this initial proposition. In addition Interbeef are very keen to see the further development of this service to consider other requirements/functions, e.g., imputation and/or genotypes for genomic evaluation.
Top 3 to 5 Issues for this SC/WG/TF	• Expansion of routine genetic evaluation services for range of key profit traits. • Growth in participation within the group, to include new breeds and new members. • Establishment of GenoEx PSE and the extension of this service to consider the sharing of genotypes.
How does this SC/WG fit into ICAR strategy?	• Strong link based on the development of international beef genetic evaluations services that are required by members. As part of this work, Interbeef are developing standard/principles that will help ensure more accurate beef genetic evaluations in the future.
In the chair's opinion how can the Secretariat give greater assistance to the working of the SC/WG?	• Strong endorsement and support for the GenoEx PSE proposition. • Extension of the GenoEx PSE service to incorporate other requirements, most notably the storing of genotypes for genomic evaluations. • Ongoing support for the rolling out of international evaluations for beef cattle.
Finances – summary of any proposals that required ICAR funding. Objective and budget by year.	• None at this stage, but I anticipate that we may have some requests following the meeting in Krackow, most notably around; (i) the sharing of genotypes lists amongst Interbeef members, (ii) the extension of the GenoEX PSE service to cover storing/sharing of genotypes, and (iii) the initiation of a new "international" project to centrally store and share high value phenotypes, such as feed intake, for research and genetic/genomic evaluation.

ICAR Group Report

Date *of report*		
SC/WG/TF/ *name*	**Parentage Recording Working Group**	
Chair	Suzanne Harding	
Members *Name, organization, country and year joined, email contact*	• Wim van Haeringen, VHL, Netherlands, 2010, wha@vhladmin.nl • Suzanne Harding, Cattle Information Services, UK, 2008, Suzanne@thecis.co.uk • Charl Hunlun, SA Stud Book, SA, 2010, charl@studbook.co.za • Hossein Jorjani, Interbull centre, Sweden, 2010, Hossein.Jorjani@hgen.slu.se • Linda Markle, Holstein Canada, 2011, lmarkle@holstein.ca • Matthew McClure, ICBF, Ireland, 2013, mmcclure@icbf.com • Carine Megneaud, France, 2014, carine.megneaud@cotes-d-armor.chambagri.fr • Reinhard Reents, VIT, Germany, 2010, reinhard.reents@vit.de • Matthew Shaffer, Dairy Australia, 2013 MShaffer@holstein.com.au • Marija Spehar, Croatian Agricultural Agency, Croatia, 2014, mspehar@hpa.hr • Suzan Tellez, Resource Computing, US, 2008, sztellez@aol.com • George Wiggans, USDA, USA, 2010, George.Wiggans@ARS.USDA.GOV • Marco Winters, DairyCo, Uk, 2010, Marco.Winters@dairyco.org.uk	
Members left – *none of these have been active since the first meeting apart from Hans*	• Paolo Ajmone Marsan • Donagh Berry • Paul van Raden • Hans Wilmink	
Meeting(s) since July 2014	**Last:** **20/05/14 – Berlin** **23/07/14 – TelCon** **18/12/14 – Telcon** **14/04/14 - Telcon**	**Next:** **09/06/15 - Krakow**
Participation	**20/05/14** – Charl Hunlun, Hossein Jorjani, Milan Zjalic, Wim van Haeringen, Matt McClure, George Wiggans, Brian Wickam, Suzanne Harding	**Absence**

	23/07/14 - Charl Hunlun, Marija Spehar, Matt McClure, Hossein Jorjani, George Wiggans, Reinhard Reents, Linda Markle, Suzanne Harding **18/12/14** - Marija Spehar, George Wiggans, Linda Markle, Suzanne Harding **14/04/15** - George Wiggans, Matt McClure, Marco Winters, Marija Spehar, Linda Markle, Suzanne Harding	
Key Agenda Issues	1. new accreditation for applying the results of genotype analysis 2. GENOEX	
Important Decisions made since May 2014	Defined a new section for the ICAR Guidelines and web site - accreditation of applying the results of Genotype Analysis for Parentage Verification	
Active cooperation and links to other ICAR SC/WG/TFs and other international bodies such as ISO, EU, IDF, ISAG, world breed organisations, manufacturers etc	Genetic Analysis WG INTERBULL WHFF Data Exchange WG ISAG	
Issues to be handled by the Board & Deadlines	1. Industry database and exchange for the parentage SNPs 2. Who should email contact at ICAR be for return of new accreditation application forms? 3. Assessing the new accreditation - Who will be the committee of experts and how will they be funded? See Charl email 5th March 2015, suggesting that expert body for this is GENOEX- PSE	
Top 3 to 5 Issues for this SC/WG/TF	1. Guidelines for an accreditation for applying the results of genotype identification. 2. Good practices guideline for natural service, liaising with AI WG 3. Guidelines as to acceptable level of errors in a population and what should be done about high occurrence of errors 4. Define the percentages of herds and animals that should	

	be parentage checked 5. Define possible alternatives for optimal Parentage Recording. 6. Produce optimal parentage recording guidelines 7. Include parentage discovery and microsatellite imputation from SNPs as a guideline, once they are fully agreed. 8. Extend parentage recording to all species and all mating systems
How does this SC/WG fit into ICAR strategy?	It should be a key part of the ICAR strategy. If an animal is incorrectly identified, it's data will be of no value, and at worst, data will be used incorrectly
In the chair's opinion how can the Secretariat give greater assistance to the working of the SC/WG?	They already help me a lot. (Thank you!)
What funds have been received from ICAR since June 2013 and how have they been used?	None
Finances – summary of any proposals that required ICAR funding. Objective and budget by year.	None

International Committee for Animal Recording

ICAR Group Report
WG on Performance Recording of Dairy Sheep

Date *of report*	26 May 2015	
SC/WG/TF/ *name*	WG Performance Recording of Dairy Sheep	
Chair	Jean-Michel Astruc	
Members *Name, organization, country and year joined, email contact*	• Jean-Michel Astruc, Institut de l'Elevage, France, 1990, jean-michel.astruc@toulouse.inra.fr • Zdravko Barać, Croatian Agricultural Agency, Croatia, 2010, zbarac@hpa.hr • Antonello Carta, IZCS, Italy, 2008, ancarta@tiscali.it • Elisha Gootwine, Volcani Center, Israel, 1986, gootwine@volcani.agri.gov.il • Drago Kompan, University of Ljubljana, Slovenia, 2006, Drago.Kompan@bfro.uni-lj.si • Franz-Josef Romberg, Dienstleistungszentrum Ländlicher Raum Westpfalz, Germany, 2002, franz-josef.romberg@dlr.rlp.de • Alessia Tondo, AIA, Italy, 2010, tondo.a@aia.it • Eva Ugarte, Neiker, Spain, 2008, eugarte@neiker.net	
Members left	Francis Barillet, INRA, France (since 2014)	
Meeting(s) since May 2014	Last: 20 May 2014, Berlin, Germany (Jointly with the goats WG)	Next: 8 June 2015, Krakow, Poland (Jointly with the goats WG)
Participation	Full +: Jean-Michel Astruc (member), Zdravko Barać (member), Francis Barillet (member), Antonello Carta (member), Franz-Josef Romberg (member), Alessia Tondo (member), Veysel Ayhan, Daiva Beinoriené, Irfan Daskiran, Maja Drazic, Zeljka Fatović, Mauro Fioretti, Denis Gaumont, Tilman Hoefelmayr, Charl Huy, Gintare Kisieliene, Dalia Laureckaite-Tumeliene, Ricardo Negrini, Axel Prediger, Sotero Salaris, Brian Wickham, Ming-Che Wu	Absence : E. Gootwine, D. Kompan, E. Ugarte
Key agenda issues	1. Membership of the WG 2. Changes in the guidelines : quality assurance for AC method + udder morphology 3. Introduction of the section 2.2 : statement of principles 4. Presentation of the results of the sheep enquiry on-line and discussion 5. Presentation of the new tables : milk quality + electronic milk meters 6. Milk recording devices : tests on-farm	
Important Decisions made since May 2014	Adoption of the statement of principles by the WG, as an introduction of section 2.2 of the guidelines. Review the form of the survey (simplify and make clearer some tables)	

International Committee for Animal Recording

ICAR Group Report

Date *of report*	29 May 2015	
SC/WG/TF/ *name*	World Breeds Federations Working Group	
Chair	Matt Shaffer	
Members *Name, organization, country and year joined, email contact*	1. Clara Diaz Martín, INIA, Dpto. Mejora Genética Animal, Spain 2. Egbert Feddersen, Deutscher Holstein Verband e.V., Germany 3. Charl Hunlun, SA Stud Book Association, South Africa 4. Josef Kucera, World Simmental-Fleckvieh Federation, Czech Republic 5. Juhani Mäki-Hokkonen, ICAR Secretariat, Italy 6. Brian Wickham, ICAR Secretariat, Ireland 7. Milan Zjalic, ICAR Secretariat, Croatia 8. Roger Trewhella, World Jersey Bureau, UK	
Members left	1. James Godfrey, World Jersey Bureau, UK	
Meeting(s) since May 2014	Last: email correspondence	Next: 8 June 2015
Participation	Full:	Absence:
Key agenda issues	GENOEX-PSE	
Important Decisions made since May 2014	This past year has been more about consideration of the GENOEX proposals and ensuring there is a link between the World Breeds and activity within ICAR.	
Active cooperation and links to other ICAR SC/WG/TFs and other international bodies such as ISO, EU, IDF, ISAG, world breed organisations, manufacturers etc	1. Active work with Parentage Recording WG 2. Active discussion with World Holstein 3. Active discussion with World Jersey 4. Link to Conformation WG	
Issues to be handled by the Board & Deadlines	Support for a review of membership to align members with key stakeholder groups.	
Top 3 to 5 Issues for this SC/WG/TF	1. GENOEX-PSE 2. Reworking membership 3. Defining further areas for collaboration	
How does this SC/WG fit into ICAR strategy?	The WG is establishing closer ties with other international bodies, which helps make ICAR more affective. By ensuring resources are used efficiently and that world breeds are connected, ICAR improves its chance of success in areas of overlap.	
In the chair's opinion how can the Secretariat give greater assistance to the working of the SC/WG?	Not needed at this time.	
Finances – summary of any proposals that required ICAR funding. Objective and budget by year.	Nil	

Active cooperation and links to other ICAR SC/WG/TFs and other international bodies such as ISO, EU, IDF, ISAG, world breed organisations, manufacturers etc	International experts on claw health: cooperation within standardisation of foot and claw disorders (ICAR Claw Health Atlas) Cooperation with project SSynCAHD: Kathrin Stock participated in a workshop in Ghent, 27th of March 2015 on "Standardising Syndromic Classification in Animal Health Data". The aim of the SSynCARD project is (Workshop report Ghent 20150327): As discussed in the first project workshop, and reviewed in this workshop, an ontology will be developed by the SSynCAHD project, according to the following competency goals: • *Ontology domain: veterinary syndromic surveillance* • *To describe the terms and relations necessary to detect the occurrence of animal health events of interest for surveillance though recorded animal health data.* • *To allow standardisation of syndromic classification of animal health data without the need for common coding practices, acknowledging the differences in data recording practices across animal health domains, institutions and countries.* • *To be freely available* • *Built by the veterinary syndromic surveillance community and maintained by a group of curators* Cooperation with ICAR WG Animal Welfare Recording: Kathrin Stock is member in both working groups and providing the link. Cooperation with IDF: A meeting between the ICAR WGFT and IDF was conducted in Berlin 20th of May 2014. The following was agreed: *The Deputy Chair of the IDF Standing Committee of Animal Health and Welfare, Dr. Olav Osteras, will represent IDF as permanent observer at the ICAR WGFT. Information between the ICAR WGFT and IDF Standing Committee of Animal Health and Welfare will be exchanged. Further possibilities of cooperation will be identified in future.* No further activities have been undertaken so far. Cooperation with Gene2Farm: In 2014 a meeting in Berlin with Andrea Rosatti, Enrico Santos and Brian Wickham was conducted. Information about the present status of work of the ICAR WGFT was provided to Gene2Farm. The link between ICAR WGFT and Gene2Farm is also based on the fact that Christa Egger-Danner is working for ZuchtData and ZuchtData is SME partner of Gene2Farm project. Link to with other projects: MIR (Gengler), Efficiency/Methan (Pryce),..
Issues to be handled by the Board & Deadlines	Approval of ICAR Claw Health Atlas ICAR Claw Health Atlas**:** For the first time internationally agreed and standardized descriptions of foot and claw disorders are becoming available. It would be important that this ICAR Claw Health Atlas could be also promoted to be recognized outside of ICAR by other international organisations (FAO, EFSA,..) Visibility of guidelines: Presently it is still difficult to find the ICAR guidelines, especially for external organisations. An attractive and clearly structured website would help to promote the activities of ICAR. When searching ICAR publications, preliminary versions ('submitted for approval') are more likely to be found than the final, officially published guidelines. This provokes erroneous citations or complete ignorance of this source of information (implying negative impact on the visibility of ICAR).

Top 3 to 5 Issues for this SC/WG/TF	• Claw health recording – promotion of ICAR Claw Health Atlas outside of ICAR • Udder health – Update of guideline • Publication of results of ICAR WGFT (Guideline on Health, Claw Health,..)
How does this SC/WG fit into ICAR strategy?	Functionality aspects are gaining more and more interest internationally, particularly in the context of using new phenotypes in breeding. More and more activities are coming up and therefore standardisation of functional traits and providing of guidelines can support this development.
In the chair's opinion how can the Secretariat give greater assistance to the working of the SC/WG?	The ICAR secretariat is very helpful and supportive. Thank you.
Finances – summary of any proposals that required ICAR funding. Objective and budget by year.	ICAR Claw Health Atlas – publication: limited number of printed issues (would be nice if each author and contributor of the ICAR Claw Health Atlas would receive a few printed copies (maybe 5) together with an official letter from ICAR to thank them) – payment of the costs need to be discussed Optional: the idea exists that in connection with the next ICAR meeting or (preferably) another international meeting a workshop on claw health recording could be organised. The ICAR WGFT is ready to organise the programme and contact the experts for giving talks, but otherwise assistance would be needed.

ICAR Accuracy Task Force Report

Author: Accuracy Task Force

Draft v6 1 June 2015.

Table of Contents

1 Recommendations

1. The ICAR Guidelines be expanded to include guidelines for evaluating the benefits arising from each of the uses of animal recording data with special consideration to the relationship between the benefits from each use and the accuracy of the original recording data.
2. Review ICAR Guidelines to ensure identification systems used for animal recording accurately link each animal to its phenotypes, genomic information, environments, parents and contemporaries.
3. ICAR guidelines for all measurements include tools to establish and publish the accuracy of original recording data relative to the relevant gold standard.
4. Establish the accuracy of the animal recording information systems that collect and store original data and provide information for use in decision-making.
5. Members implement continuous improvement processes to ensure their animal recording business provides valuable information for decisions related to animal: breeding, management, product quality, and health.

2 Introduction

This is the sixth draft of the report from the Accuracy Task Force (A-TF) established by the ICAR Board in November 2013. The membership of the A-TF was finalised in the third quarter of 2014 and work commenced in the fourth quarter of 2014.

This draft has been prepared for consideration by the ICAR Board and Chairpersons of the ICAR Groups in June 2015.

Terms of Reference

ICAR established the A-TF in response to a growing concern that it was following a philosophy and using tools to address questions of accuracy that were no longer fit for purpose. The challenges ICAR and its members are facing arise from a plethora of new devices for gathering recording data on farms and in-line measurements during, for example, milking. Some of these devices are less accurate than conventional recording but make up for this loss of accuracy by providing many repeated measures.

The objectives of the A-TF[1] are to:

a. *Develop a scientifically sound philosophical basis for ICAR to use in establishing accuracy guidelines for the collection of animal recording data that is incorporated into information services that support:*

   i. *breeding,*

[1] Terms of Reference for ICAR Accuracy Task Force. Author: Brian Wickham. Dated: 11th July 2013.

[2] ICAR RULES, STANDARDS AND GUIDELINES ON METHODS OF IDENTIFICATION, ICAR Guidelines

ii. *farm management,*

iii. *traceability/supply chain/quality assurance,*

iv. *health/welfare.*

b. *Provide statistical tools and guidelines, for use by ICAR Groups in establishing accuracy guidelines relevant to their particular area of expertise.*

In the course of our work we have also identified some case studies that illustrate the use and value of particular tools.

Members

Members of the A-TF are given in Table 1.

Table 1. ICAR Accuracy Task Force – name, country and expertise.

Martin Burke, Ireland, milk recording, recording devices and quality systems
Kees de Koning, Netherlands, recording device testing, and statistical systems.
Albert De Vries, USA, precision systems, research and management information
Bevin Harris, New Zealand, statistics, animal breeding and recording systems
Esa Mäntysaari, Finland, statistics, animal breeding and research
Filippo Miglior, Canada, milk recording, research and animal breeding
Harrie van den Bijgaart, Netherlands, milk analysis, milk recording and analytical systems
Joel Weller, Israel, statistics, economics, research and animal breeding
Brian Wickham, Ireland, Convenor
Karl Zottl, Austria, Field use of quality data

Process

The process by which this report has been developed consisted of a series of meetings (Table 2) at which ideas were considered, having been distributed by email in advance of each meeting. The ideas were discussed, issues identified and action plans agreed. Decisions were taken by consensus.

Table 2. Accuracy Task Force meetings.

Date	Type of Meeting
Wednesday 5 November 14	Telephone conference
Tuesday 9 December 14	Telephone conference
Monday 12 January 15	Telephone conference
Monday 9th March	Telephone conference
Monday 13th April	Telephone conference
Monday 18th May	Telephone conference
Monday 1st June	Telephone conference

3 Philosophy

In this section we outline a philosophy on accuracy that we believe is most appropriate for ICAR and its members. In the course of our considerations we have made a number of recommendations that we believe best capture the key points of the philosophy. These recommendations are given at the end of the relevant sections and are repeated in section 1 above.

Terminology

Some of the terminology associated with accuracy relevant to the activities of ICAR has been defined through international convention as summarised in Table 3.

Table 3. Sources of definitions related to accuracy and relevant to the activities of ICAR and its members.

Definitions	Source	Reference:
Related to guidelines for expressing the uncertainty of measurement (GUM).	International vocabulary of metrology – Basic and general concepts and associated terms (VIM). Published by International Bureau of Weights and Measures (BIPM).	http://www.bipm.org/en/publications/guides/ Accessed 25th Feb. 2015.
Related to accuracy of measurement methods and results.	Accuracy (trueness and precision) of measurement methods and results — Part 1: General principles and definitions. ISO 5725-1.	https://www.iso.org/obp/ui/ -iso:std:iso:5725:-1:ed-1:v1:en Accessed 25th Feb 2015.
Related to all aspects of disease testing and diagnosis.	OIE Terrestial Manual 2013.	http://www.oie.int/en/international-standard-setting/terrestrial-manual/access-online/ Acessed 3rd March 2015.

For convenience the key definitions of relevance to ICAR have been extracted from these sources and are attached as appendix 1. However, this literature is focused primarily on the original measures and as explained below this is only one of several considerations in determining the accuracy of the information resulting from animal recording activities.

In the body of this report we have attempted to use simple readily understood terms and to provide explanations in the text as needed.

ICAR members operate recording systems

ICAR's full members are organisations who operate recording systems for farm animals – mainly cattle, sheep and goats.

Recording systems involve a multi-step process, which includes some or all of the following steps:

a. identification of a target group of animals for which records are to be collected

b. determination of the extent to which the group of animals share the same environment in terms of nutrition, management and exposure to diseases

c. identification of the animals within the target group for which records are not collected

d. identification of an animal

e. taking of a sample from the animal or from its production (milk, tissue, …)

f. the measurement (which by definition includes observations, that is, measurement by visual assessment) of one or more attributes of the animals, for example weight and milk yield, or the taken sample

g. validation of the measurement and its association with an individual animal

h. storage of the results in a database

i. extraction and combining of data from databases to compute genetic evaluations which are stored back into databases and distributed to the breeding industry for use in breeding decisions

j. extraction, statistical analysis, formatting and distribution to herd owners of a wide range of reports

k. use of the reports by the herd owner to make farm management decisions (breeding, culling, drying-off, nutrition, disease control, …)

l. extraction, statistical analysis, formatting and distribution to the wider industry and community, nationally and internationally, of reports which provide comparative information over time, over organisations, over countries of animal production characteristics (breeding, farm management, supply chain and health).

The recording process as operated by ICAR members is summarised by .

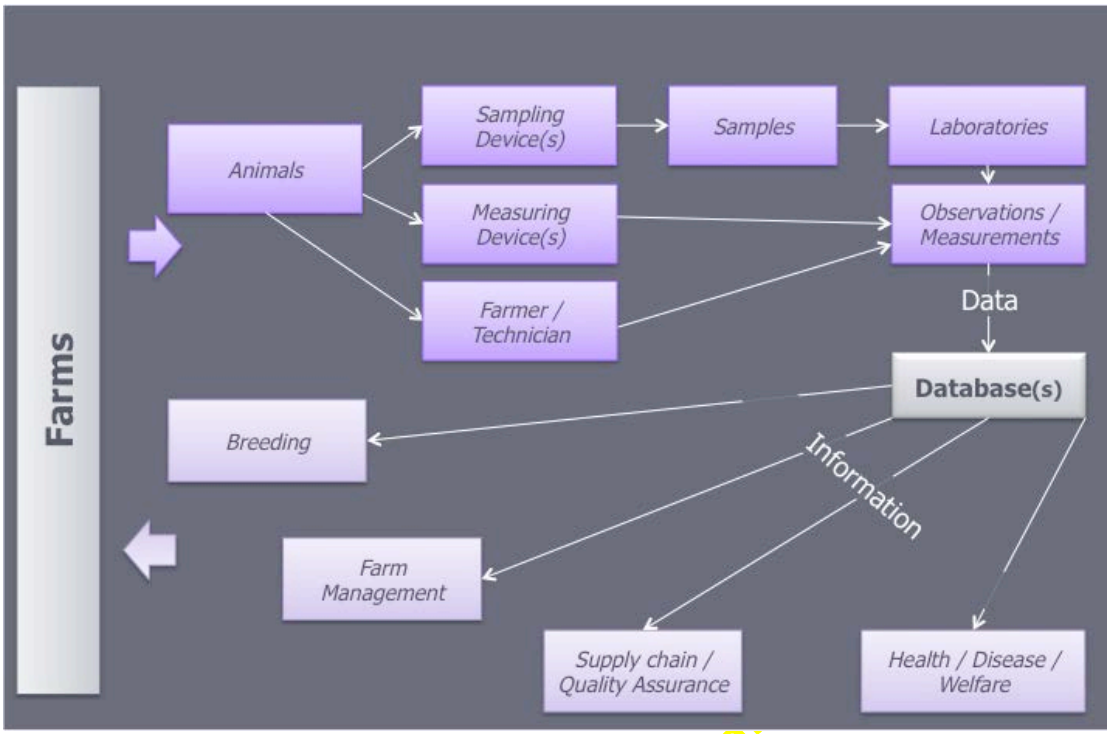

Figure 1. The recording process as operated by ICAR members.

The output of recording systems is information for decision making

Animal recording is partly an economic activity and partly a *good practice*. Farmers, recording organisations, industries and societies provide the resources, including funding and access to animals, to facilitate animal recording. The reasons for providing this support include:

a. The *good practice* of having factual information on the performance of individual animals.

b. To provide information which facilitates breeding, culling and a wide range of other farm management decisions by farmers.

c. To provide data which is used for research relevant to animal farming resulting in information that is used by the animal production sector in its decision-making.

d. To provide information which is used by breeding organisations and a wide range of other organisations in developing and providing services to farmers.

e. To provide information that is used by public bodies to design legislation, and to support: quality assurance, public health, animal health and other community wide initiatives.

In short, animal recording is primarily about providing information, which is used in decision-making as shown pictorially in . **Recording**, the first step in the process, involves the collection typically of multiple observations and measurements on individual animals over a period of time. The second major step is the **processing** of the resulting data. This step includes a number of

activities such as data validation and data storage, which are followed periodically, by the **delivery of information** for use in a range of decisions, the third step. Information delivery includes the combining of data collected over extended time periods from multiple animals followed by an analysis step and evaluation step. The resulting information is the input that used in decision-making. The first three steps incur costs. The consequence of the decisions made is the point where the benefits of recording are realised. These benefits include a combination of desirable outcomes such as: increased income, reduced costs, improved product quality, reduced waste, improved animal health and improved animal welfare.

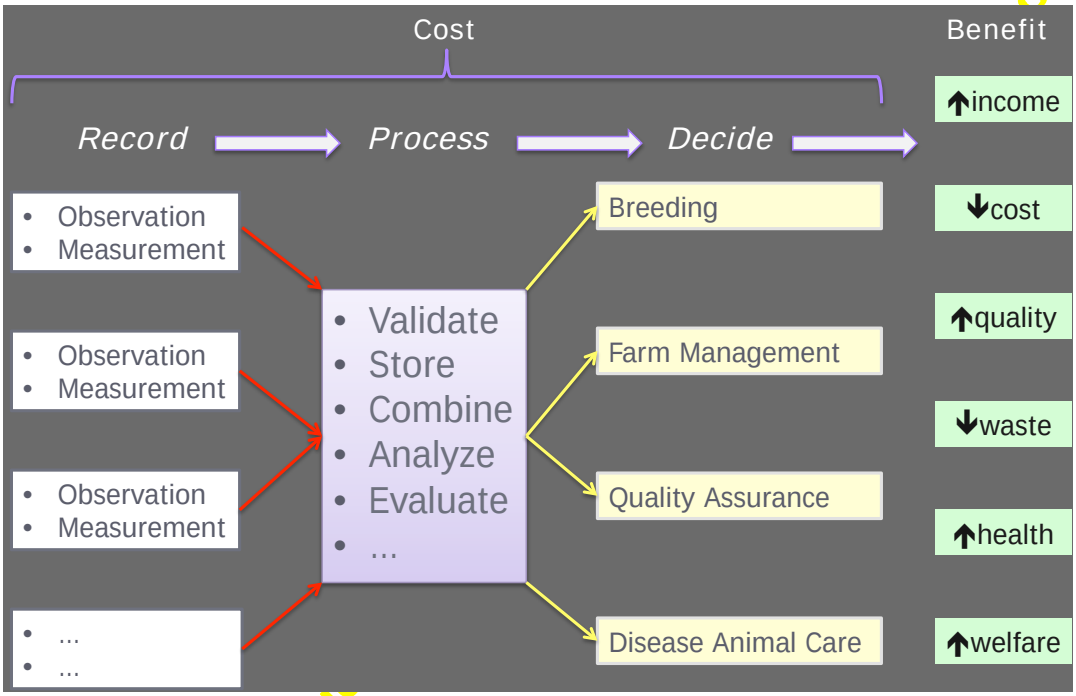

Figure 2. Pictorial description of the recording process showing link between costs and benefits.

Optimal recording system design

Optimising the design and operation of animal recording systems involves consideration of the cost of recording relative to the economic benefit obtained by using the resulting information to make better decisions affecting the future. The value of the information arising from animal recording is determined partly by the relationship between the information and the potential future outcome. The strength of this relationship is measured in different ways, depending on the nature of the information, but generally can be referred to as the *accuracy* of the information for the decision being made.

Data from animal recording is used in preparing information for use in a multitude of decisions. The optimal design of an animal recording system is the one that maximises benefits relative to costs over all decisions. Finding this optimum is a complex task considering:

- **on the benefit side**: the multitude of information products, the multitude of decisions, the multitude of decision makers, the extended time periods over which decisions are made,
- **on the cost side**: the rapid development in recording devices, the rapid development of information processing tools, the rapid development of analytical tools,
- **and** recognising that the same recording data is used in multiple way in different decisions.

For these reasons the design of animal recording systems has tended to involve consideration of a limited range of decisions, and associate benefits, and a limited range of recording systems, and associated costs. This is also reflected in the approach that ICAR has taken towards the subject of accuracy. Initially ICAR and its recording members focused on the use of milk recording data in animal breeding decisions. As dairy cattle breeding objectives have expanded to consider a wider range of traits, and ICAR membership has expanded to consider beef cattle and other species, so ICAR has developed relevant guidelines. For example, for functional traits, conformation traits, beef traits, sheep & goat milk recording, and fibre for sheep, goats, and alpacas. This trend towards a wider range of recording systems covering more traits and more types of animals is being added to by expansion of the services provided by recording organisations into, for example, information services for: farm management, animal nutrition, environmental management, product quality assurance and animal health and welfare (refer to). ICAR needs to ensure its philosophy and structure produces the guidelines and services that are most valuable to its members as they evolve.

For these reasons, it is recommended that ICAR place greater emphasis on the benefit side of animal recording by giving consideration to the decisions for which information from animal recording is used to support. This greater emphasis should be in the form of guidelines on the evaluation of the benefits provided by the information coming from animal recording, for each of the decisions that are based on information from animal recording. In this process the significance of the accuracy of the animal recording data will be established and thus provide a firm foundation for evaluating recording tools which differ in both accuracy and cost.

Recommendation 1.

The ICAR Guidelines be expanded to include guidelines for evaluating the benefits arising from each of the uses of animal recording data with special consideration to the relationship between the benefits from each use and the accuracy of the original recording data.

Identification system

The most fundamental element of the accuracy of animal recording is that of animal identification. Accurate recording can only exist where there is a system of uniquely identifying each animal as laid out in the ICAR Guidelines[2].

The uses of animal records: breeding, farm management, quality assurance and animal health all suffer a substantial risk of loss of accuracy due to selection bias if not all the contemporary animals are identified and recorded. Most uses of the records involve some form of comparison between the individual animal and its contemporaries exposed to the same environment. Where contemporaries are not recorded, and thus not included in the comparison, the comparison can be severely biased. Best practice is for all animals to be identified and recorded.

The use of animal records for breeding information requires knowledge of the parentage of each animal. Where this is missing, unknown, or incorrect, there is a loss of accuracy in the resulting breeding information. Recording of parentage is addressed by the ICAR Guidelines[3] and the development of DNA technologies is providing new and lower cost tools for validating parentage of animals. These same tools are also becoming a routine part of quality assurance schemes for meat products as they facilitate tracing of products to their origin. There are important accuracy considerations associated with these uses of animal records.

It is recommended that the ICAR identification standards and guidelines be reviewed to ensure the accuracy of the linkage of each animal to its own records and that of other animals affecting the accuracy of the information provided for the full range of data uses.

Recommendation 2.

Review ICAR Guidelines to ensure identification systems used for animal recording accurately link each animal to its phenotypes, genomic information, environments, parents and contemporaries.

[2] ICAR RULES, STANDARDS AND GUIDELINES ON METHODS OF IDENTIFICATION, ICAR Guidelines 2014, page 9-10.

[3] ICAR GENERAL RULES AND GUIDELINES FOR PARENTAGE RECORDING METHODS, ICAR Guidelines 2014, page 11-13.

Calibration and validation

Measures[4] obtained for individual animals are the original data arising from animal recording activities. In order for these original data to contribute to information for decision making it is essential that their relationship with traits of economic importance is well established. There do exist tools and processes for calibrating and validating these measures.

Typically, calibration involves research in which the measure is compared with a usually much more expensive measure of the *gold standard*[5] for the trait. It is imperative that this research encompasses the range of situations – for example: breeds, nutrition, analytical devices - in which the measures will be made.

The two main considerations in calibration are trueness[6] and precision[7]. Of greatest concern is trueness especially if a lack of trueness is associated with any aspect of the circumstances in which the measure is made. For example, the bias in milk volume is greater in some milk meters than others. Precision is also important but its impact can be reduced by the use of repeated measurements.

Validation typically involves independent research in which the measurement is made using animals that are not part of the calibration data set. These are then compared with the *gold standard*. Where validation fails, the original calibration may be updated, the circumstances in which the measure may be used are restricted, or the measure may fall into disrepute.

It is crucial that the calibrations and validations underpinning all measures used in animal recording are published and thus readily available for independent scrutiny.

Recommendation 3.

ICAR guidelines for all measurements include tools to establish and publish the accuracy of original recording data relative to the relevant *gold standard*.

Animal Recording Information system

Animal recording information systems can be viewed as having two main components: data recording and information production.

Data recording covers the collection and storage of the original data so that it can be incorporated into information products in the future and used in research. The basis for most, if not all, information products using animal

[4] Which include observations.

[5] Other terms used are: reference value, true value,

[6] Other terms used are: accuracy, bias, validity, and systematic error

[7] Other terms used are: reliability and random error.

recording data is the deviation of each animal's measure from that of its contemporaries, in the same environment. For this reason, the recording system needs to pay particular attention to ensuring:

- Sufficient data is collected to define the environment for each animal,
- Measures are collected on all animals exposed to the same environment, and
- Where it is not practical or economic to measure all animals in the same environment then sufficient steps are taken to ensure there is no bias arising due to selection of the animals that are measured.

A particular risk found in data recording systems is the presence of preferential treatment for some animals within a group that are supposedly exposed to the same environment. Where this occurs serious biases can result, with the consequence that decisions based on the resulting information are seriously flawed[8].

Data arising from animal recording is potentially valuable for decisions being made by parties other than the farmer who was responsible for its collection, many years after the data was originally collected. To facilitate these uses it is very important that extra care be taken during the collection process and that sufficient public, or industry, funding is provided to facilitate this extra care.

Information production covers the process of delivering information that is then used in decision-making. This process is, perhaps, at its most complex for genetic evaluations in dairy cattle where it comprises many steps, uses data from a very large number of sources, including from almost all other countries with populations of the same breed, and produces breeding value predictions that are combined with economic information into selection indexes. The process has become even more complex with the recent inclusion of genomic data derived from DNA chips identifying single nucleotide polymorphisms (SNP) and extensive calibration and validation research studies. The information production process can be as simple as age group averages for cows lactating at the same time in a single herd. In all cases, the key consideration in terms of the benefits that result, is the ability of the information to predict the outcomes that are being chosen between in the decision being made. **The ability of the information to predict the future is thus ultimately the key factor determining the benefit of recording**.

An important component of the animal recording system is the processes by which recorded data and the information produced is **quality assured**. This includes: staff training, staff supervision, data validation, exception handling, change control, and many other contributors to both the cost of recording and the accuracy of the resulting information.

[8] Potential Biases in Predicted Transmitting Abilities of Females from Preferential Treatment. M.T. Kuhn, P.J. Boettcher, A.E. Freeman. Journal of Dairy Science, Vol. 77, Issue 8, p2428–2437. Published in issue: August, 1994

The accuracy of the information arising from data recording is at risk where the funding of data recording and information production is provided by a party with a vested interest in the information outputs. For example, if genetic evaluations came under the control of semen sellers as a result of funding they provided. It is very important that the organisations responsible for data collection and information production are able to operate independently of vested interests.

In summary, animal recording systems comprise five elements that each contributes to the accuracy of the information provided for decision-making. These are, as described above: identification, calibration, data recording, information production and quality assurance. To be able to optimise and improve the benefit to cost ratio of animal recording, it is crucial that the contribution of each of the five elements to the accuracy of the resulting information is quantified and understood.

Recommendation 4.

Establish the accuracy of the animal recording information systems that collect and store original data and provide information for use in decision-making.

Continuous improvement

ICAR's members operate in a wide range of commercial environments that are changing rapidly due to many factors including:

- advances in analytical, information and DNA technologies,
- competition and increased competition for some information services,
- reduction in public funding for activities delivering long term public benefits,
- new knowledge and understanding, and
- the discovery of improvement opportunities.

For these reasons it is imperative from a cost and benefit point of view that animal recording information systems are subject to a process of continuous improvement. These processes typically employ a quality management philosophy as originally espoused by W Edwards Deming[9] that have more recently evolved into tools including Six Sigma™[10], ISO 9000[11] and Lean Manufacturing[12]. These processes focus on ensuring the animal recording

[9] http://en.wikipedia.org/wiki/W._Edwards_Deming, accessed 4th May 2015.

[10] http://en.wikipedia.org/wiki/Six_Sigma, accessed 4th May 2015.

[11] http://en.wikipedia.org/wiki/ISO_9000, accessed 4th May 2015.

[12] http://en.wikipedia.org/wiki/Lean_manufacturing, accessed 4th May 2015.

information system achieves optimal benefit to cost ratios for the customers of animal recording. Their focus includes:

- removing waste thus reducing cost,
- reducing errors, thus reducing cost and improving the accuracy of the resulting information, and
- incorporating new knowledge, and new technologies into information products thus increasing the benefits for the customers of animal recording organisations.

Animal recording organisations need to have processes for ensuring their information services maximise benefits relative to costs. In effect, this means ensuring that any trade-off between cost and accuracy results in improved benefits to costs. ICAR is well placed to assist its members as they pursue these improvement processes by providing guidance and facilitating the sharing of experiences between members.

Recommendation 5.

Members implement continuous improvement processes to ensure their animal recording business provides valuable information for decisions related to animal: breeding, management, product quality, and health.

4 Tools

This section of our report contains a selection of tools that we have identified as being relevant in evaluating aspects of animal recording accuracy. They are divided into three categories: measurement system analysis, recording process optimization, and cost benefits.

Measurement System Analysis - MSA

A measurement system is an appraisal activity whose primary purpose is to compare the product/service to applicable specifications and standards to determine whether it conforms to requirements.

A measurement method is VALID if it appropriately represents the feature of the measured object or phenomenon that is of interest.

A measurement is PRECISE if it produces small variation in repeated measurements of the same object.

A measurement system is ACCURATE (unbiased) if, on average it produces the true values of quantities of interest.

Factors in selecting equipment and systems for measurement and scoring:

- Repeatability – its ability to produce the same result over and over under the same conditions.
- Reproducibility – its ability to produce the same result at different places and at different times, e.g. under different conditions.

- Resolution (Sensitivity) – the smallest unit of scale that is produced.
- Magnification – amplification of output for measuring input. The higher the sensitivity, the greater the magnification required.
- Stability (drift) – the results, for the same conceptual samples, are the same over time.
- Linearity – expresses the constancy of the ratio between the increase in the *gold standard* and the corresponding increase of the result.
- Calibration – is the relation between the *gold standard* and the measure provided by the equipment. Calibration occurs before a decision to use the measure and must cover the range of circumstances and *gold standard* variation in which the measure will be made.

Corollary

Data are the basis for drawing conclusions, it does not determine decisions. The same data forces different people to draw the same conclusion but they can make different decisions based on it.

A conclusion can be 'right' or 'wrong' but not 'good' or 'bad'. A decision can be 'good' or 'bad' but not 'right' or 'wrong' – There are no wrong decisions, only bad ones, there are no bad conclusions only wrong ones!

These tools focus on the measurements made on individual animals and on the samples taken from them. *"If measurements are used to guide decisions, then it follows logically that the more error there is in the measurements, the more error there will be in the decisions based on those measurements. The purpose of Measurement System Analysis is to* ***qualify a measurement system for use by quantifying its accuracy, precision, and stability****."*[13] They thus deal with ensuring the properties of the original data collected by an animal recording system are known and are within acceptable limits of tolerance.

The key elements of MSA are: firstly, on the relationship between the measures and the *gold standard,* with *accuracy* and *precision* being key characteristics as illustrated in .

[13] https://www.moresteam.com/toolbox/measurement-system-analysis.cfm accessed 7th January 2015.

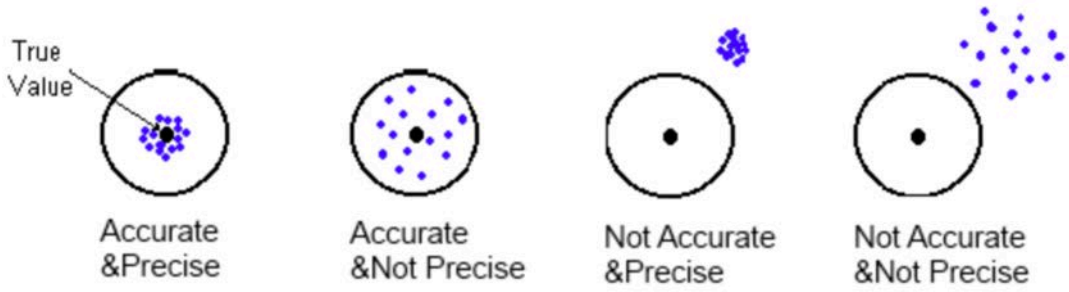

Figure 3. Measurement system analysis illustration showing the relationship between measure (blue spots) and gold standard (true value and central black spot) distinguishing accuracy (bias, systematic error, validity, trueness) from precision (reliability, random error).

Secondly, is the *stability* of the measure. *Stability* refers to the extent to which results of (conceptual) repeated measures on the same sample (or animal) give the same results. The main tools for measuring *stability* are *repeatability* and *reproducibility*. Where *repeatability* applies to repeated measures under the same condition and *reproducibility* applies to repeated measure under different conditions. What constitutes the same and different conditions needs to be carefully defined where these tools are being used. For animal recording this is particularly relevant as the same measures are being used in many organisations, spread over many countries, over extended periods of time.

MSA tools are used extensively in milk testing laboratories that provide milk composition measures for animal recording.

MSA tools are also particularly relevant for milk sampling and milk metering devices used in animal recording. Milk sampling is part of the process of determining milk composition and should be included in the consideration of milk composition measures using MSA tools. Milk metering is primarily concerned with determining the volume (or weight) of milk produced and MSA tools are also appropriate. In all of these cases there are well-established *gold standards* and both the standard and measure are on a continuous scale.

Animal recording includes situations where there is no precise *gold standard* or the measures are categorical with two or more categories. Examples include: calving ease (no *gold standard* and categorical), temperament (no *gold standard* and categorical), and linear traits (there is a *gold standard* at least by consensus or by an expert, and multiple categories). In these cases MSA is less applicable and other tools are more relevant depending on the uses made of the resulting data. Animal geneticists make extensive use of variance component analysis and linear models as tools for establishing the contribution of measurement and other non-genetic errors in such measures[14] [15]. They are able to evaluate

[14] K. Meyer and E.B. Burnside in 1987 JDS Volume 70, Issue 5, Pages 1061–1068. Scope for a Subjective Assessment of Milking Speed

alternative measures, for example, measures from a milking robot and scores from a linear scorer[16], and fat % from a single milking in a milking robot and a 24-hour conventional sample[17]. These tools are very robust and are also used extensively where the measure, or the underlying *gold standard,* are binomial or categorical. Validation for these measures is possible using selection experiments and studies of offspring of measured animals.

Animal recording for animal health purposes involves extensive testing for the presence or absence of a wide range of infectious agents. In these cases the *gold standard* is known and binary and the measure is also binary. The tools available include the extensive set provided by OIE as referenced in appendix 1.

Recording Process Optimization

In this section we describe a set of tools that can be used to address questions of accuracy in the context of the overall animal recording business.

The tools available for process optimisation, quality assurance and continuous improvement are extensive and well described[18]. These generic tools focus on continuous improvement in a business producing products and services. They do not contain examples specific to animal recording. They are described in an IBM™ publication for which the executive summary states:

Business process management (BPM) technologies and service-oriented architectures (SOAs) combine with Lean and Six Sigma™ to accelerate improvements and results. At the same time, they increase organizational agility and technology-enabled responsiveness. Early adopters who have worked their way past cultural and organizational barriers are seeing impressive performance and financial results such as the following examples:

a. *Improved responsiveness to market challenges, opportunities, and changes in regulatory requirements through more tightly coupled yet more flexible business and technical architectures*

b. *Improved ability to innovate and achieve strategic differentiation by driving change into the market and tuning processes to meet the specific needs of key market and customer segments*

[15] D.P. Berry, J. Coyne, B. Coughlan, M. Burke, J. McCarthy, B. Enright, A. R. Cromie and S. McParland. Animal (2013), 7:11, pp 1750–1758. The Animal Consortium 2013 doi:10.1017/S1751731113001511. Genetics of milking characteristics in dairy cows.

[16] K. Byskov, L.H. Buch and G.P. Aamand. INTERBULL BULLETIN NO. 46. Cork, Ireland, May 28 - 31, 2012. Possibilities of Implementing Measures from Automatic Milking Systems in Routine Evaluations of Udder Conformation and Milking Speed.

[17] R. Peeters and P. J. B. Galesloot. J. Dairy Sci. 85:682–688, American Dairy Science Association, 2002. Estimating Daily Fat Yield from a Single Milking on Test Day for Herds with a Robotic Milking System.

[18] Applying Lean, Six Sigma, BPM, and SOA to Drive Business Results. Hans Skalle and Bill Hahn. This document, REDP-4447-01, was created or updated on April 18, 2013. IBM Redbooks. http://www.redbooks.ibm.com/abstracts/redp4447.html?Open. Accessed 7th Jan 2014.

c. *Reduced process costs through automation and an improved ability to monitor, detect, and respond to problems and events by using real-time data, automated alerts, and planned escalation*

d. *Lower technical implementation costs through shared services and higher levels of component reuse; changing and improving processes becomes easier and more cost effective*

e. *Lower analysis costs through collaborative online process modeling tools, access to real-time process data, and advanced process simulation capabilities.*

The term *Lean* is much heralded but often misunderstood. Its origins are from Toyota's Production System (TPS)[19] in the early 1980s. At the core of the TPS was Toyota's relentless drive to reduce waste and improve quality in their supply chain and manufacturing sites. *Lean* simply focuses your team on the elimination of waste so that every step in the process adds value in the eyes of the customer.

As a result of the success in Toyota, *Lean* management techniques and principles became widely used throughout the manufacturing world. Whether you are in the manufacturing or service industry every business activity or operation can be process mapped.

The term *Six Sigma™* is derived from the study of *process capability*. It is a measure of the *spread* and *variance* in your process. Processes that operate within *Six Sigma™* quality are assumed to produce long-term defect levels below 3.4 defects per million opportunities. *Six Sigma™* is a registered trademark of Motorola. Inc[20]. At the core of all *Six Sigma™* projects lies Deming's PDSA (Plan, Do, Study, Act) cycle of continuous improvement. However in Motorola' *Six Sigma*™ methodology, the principle is expanded into a five step discipline of DMAIC (Define, Measure, Analyse, Improve and Control – refer to .

[19] A study of the Toyota Production System, Shigeo Shingo, Productivity Press, 1989.

[20] "The Inventors of Six Sigma": Motorola website archive https://web.archive.org/web/20051106025733/http://www.motorola.com/content/0,,3079,00.html.

Figure 4. DMAIC explained.

Six Sigma™ toolkit offers a range of analysis techniques that can be used to improve your measurement system and service operation:

- Statistical Process Control (SPC) charts, Process/Machine Capability
- Gauge R & R (Repeatability and Reproducibility), aka Measurement System Analysis (MSA), Analysis of Variance (ANOVA).
- Design of Experiments
- 5S – workplace re-organisation
- FMEA – Failure Mode & Effect Analysis
- Fishbone/ Ishikawa Diagrams (5 whys and other diagrams designed to analyse data)
- Balanced Business Scorecards for KPI s

This is by no means an exhaustive list but real life examples of tools used in operational improvement programmes.

While *Six Sigma*™ alone will undoubtedly improve your QUALITY by getting your processes under control, it will not impact significantly on SPEED of processing or FLEXIBILITY – both are very necessary survival traits in today's business world! By combining and incorporating *Lean* with *Six Sigma*™ methodologies and tools, (refer to Table 4), we can sustain all three; Improved QUALITY, Improved EFFICIENCY and Improved FLEXIBILITY.

Table 4. The tools of Six Sigma™ (DMAIC) and Lean.

Six Sigma™ (DMAIC)	**Lean**
Define requirements	Define value to Customer
Map and measure the process	Value Stream Map Core Processes – challenge waste
Analyse the causes	Create Flow with value-creating steps only
Improve the process	Pull – design flow around customers pull signals not push
Control to sustain consistent KPI's	Perfection – always strive to further reduce, iterate

Six Sigma™ is an analytical approach to performance improvement and when used with *Lean* management techniques, it is a powerful tool for improving the performance of your business. It is about harnessing the people resource in your company to forensically breakdown and reconstruct your key processes to determine if they are set up for maximum efficiency. By combining the hard tools of *Six Sigma*™ and the optimisation tools of *Lean*, you can develop simple, customer-focused process maps with your staff to develop a leaner, more efficient process.

These tools address the three key elements being considered in this report: cost, benefit and accuracy.

Cost Benefits – Case Study 1

One of us[21] has described a tool that provides a generic solution to optimising the design of an animal recording system for a single purpose. It evaluates the relationship between the costs and benefits of animal recording and contains two examples which addresses two questions:

a. Implementation of a new technique should increase accuracy. Can this increase be economically justified?

b. Implementation of a new technique should reduce costs at the expense of reduced accuracy. Can the reduction in accuracy be economically justified?

Cost Benefits – Case Study 2

This[22] tool provides a more rigorous approach to making decisions regarding the use of information products claimed to enhance animal production. Two examples are given.

[21] Economic Evaluation of Accuracy. J. I. Weller, ARO, The Volcani Center. 3 page mimeo. Draft December 2014.

[22] Application of Type I and II Errors in Dairy Farm Management Decision Making. David. Galligan, William Chalupa, and Charles F. Ramberg, Jr. 1991 J Dairy Sci 74:902-910.

Example 1:

An example of quantifying the financial loss due to poor data accuracy in making culling decisions for individual dairy cows:

Culling decisions should be made based on ranking cows for future profitability. The lowest ranked animals should be culled first. This requires cashflow predictions for each cow into the future. Various research groups have computer programs that do this. Data accuracy affects these cashflow predictions. For example, if we underestimate fat% for a cow, she may be ranked lower and get culled (type I error – false negative). Another cow that should be culled stays in the herd (type II – false positive) a little longer. The economic losses of these decision errors could be quantified with computer simulation.

Example 2:

Another example is at the farm level:

Say we want to detect a problem in reproduction as soon as possible. For example we monitor days open, or pregnancy rate, or conception rate etc. There is random chance, so it is not immediately clear if there is a problem or not. Investigation of a possible problem costs time and money. It is a false alarm, money and time are wasted (type I). Not fixing a real problem also costs money (type II). So the question is, when should the management system signal a possible problem?

Statistical process control charts balance the type I and type II decision errors and minimize the total loss. Simulation could provide insight in these costs.

One could then insert less accurate data. Now there are more false alarms and maybe the type II errors also change. So there is a new total loss. This new total loss is greater than when accuracy of data is good.

Statistical process control charts can help with this.

Appendix 1 to Report of ICAR Accuracy Task Force

Terminology relevant to ICAR Activities – from VIM and ISO

The below definitions were extracted from the VIM (International Vocabulary of Metrology)[1], thereby keeping their original ordering and number and including the relevant notes with each definition. Where appropriate, also the definitions according to ISO 5725-1:1994[2] are listed in *blue italics*.

2 Measurement terms

2.3 measurand

quantity intended to be measured

NOTE 1 The specification of a measurand requires knowledge of the kind of quantity, description of the state of the phenomenon, body, or substance carrying the quantity, including any relevant component, and the chemical entities involved.

NOTE 4 In chemistry, "analyte", or the name of a substance or compound, are terms sometimes used for 'measurand'. This usage is erroneous because these terms do not refer to quantities.

2.6 measurement procedure

detailed description of a measurement according to one or more measurement principles and to a given measurement method, based on a measurement model and including any calculation to obtain a measurement result

2.7 reference measurement procedure

measurement procedure accepted as providing measurement results fit for their intended use in assessing measurement trueness of measured quantity values obtained from other measurement procedures for quantities of the same kind, in calibration, or in characterizing reference materials

2.9 measurement result

result of measurement

set of quantity values being attributed to a measurand together with any other available relevant information

NOTE 2 A measurement result is generally expressed as a single measured quantity value and a measurement uncertainty. If the measurement uncertainty is considered to be negligible for some purpose, the measurement result may be expressed as a single measured quantity value. In many fields, this is the common way of expressing a measurement result.

2.11 true quantity value

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[1] Joint Committee for Guides in Metrology. International vocabulary of metrology – Basic and general concepts and associated terms (VIM) 3rd edition 2012.

[2] International Organization for Standardization. ISO 5725-1:1994. Accuracy (trueness and precision) of measurement methods and results – Part 1: General principles and definitions

true value of a quantity,

true value quantity value consistent with the definition of a quantity

NOTE 1 In the Error Approach to describing measurement, a true quantity value is considered unique and, in practice, unknowable. The Uncertainty Approach is to recognize that, owing to the inherently incomplete amount of detail in the definition of a quantity, there is not a single true quantity value but rather a set of true quantity values consistent with the definition. However, this set of values is, in principle and in practice, unknowable. Other approaches dispense altogether with the concept of true quantity value and rely on the concept of metrological compatibility of measurement results for assessing their validity.

NOTE 2 In the special case of a fundamental constant, the quantity is considered to have a single true quantity value.

NOTE 3 When the definitional uncertainty associated with the measurand is considered to be negligible compared to the other components of the measurement uncertainty, the measurand may be considered to have an "essentially unique" true quantity value. This is the approach taken by the GUM and associated documents, where the word "true" is considered to be redundant.

2.13 measurement accuracy

accuracy of measurement,

accuracy

closeness of agreement between a measured quantity value and a true quantity value of a measurand

NOTE 1 The concept 'measurement accuracy' is not a quantity and is not given a numerical quantity value. A measurement is said to be more accurate when it offers a smaller measurement error.

NOTE 2 The term "measurement accuracy" should not be used for measurement trueness and the term "measurement precision" should not be used for 'measurement accuracy', which, however, is related to both these concepts.

NOTE 3 'Measurement accuracy' is sometimes understood as closeness of agreement between measured quantity values that are being attributed to the measurand.

ISO 5725-1: the closeness of agreement between a test result and the accepted reference value

2.14 measurement trueness

trueness of measurement,

trueness

closeness of agreement between the average of an infinite number of replicate measured quantity values and a reference quantity value

NOTE 1 Measurement trueness is not a quantity and thus cannot be expressed numerically, but measures for closeness of agreement are given in ISO 5725.

NOTE 2 Measurement trueness is inversely related to systematic measurement error, but is not related to random measurement error.

NOTE 3 "Measurement accuracy" should not be used for 'measurement trueness'.

ISO 5725-1: the closeness of agreement between the average value obtained from a large series of test results and an accepted reference value

2.15 measurement precision

precision

closeness of agreement between indications or measured quantity values obtained by replicate

measurements on the same or similar objects under specified conditions

NOTE 1 Measurement precision is usually expressed numerically by measures of imprecision, such as standard deviation, variance, or coefficient of variation under the specified conditions of measurement.

NOTE 2 The 'specified conditions' can be, for example, repeatability conditions of measurement, intermediate precision conditions of measurement, or reproducibility conditions of measurement (see ISO 5725-1:1994).

NOTE 3 Measurement precision is used to define measurement repeatability, intermediate measurement precision, and measurement reproducibility.

NOTE 4 Sometimes "measurement precision" is erroneously used to mean measurement accuracy.

ISO 5725-1: the closeness of agreement between independent test results obtained under stipulated conditions
NOTE: Precision depends only on the distribution of random errors and does not relate to the true value or the specified value

2.16 measurement error

error of measurement, error

measured quantity value minus a reference quantity value

NOTE 1 The concept of 'measurement error' can be used both

a) when there is a single reference quantity value to refer to, which occurs if a calibration is made by means of a measurement standard with a measured quantity value having a negligible measurement uncertainty or if a conventional quantity value is given, in which case the measurement error is known, and

b) if a measurand is supposed to be represented by a unique true quantity value or a set of true quantity values of negligible range, in which case the measurement error is not known.

NOTE 2 Measurement error should not be confused with production error or mistake.

2.17 systematic measurement error

systematic error of measurement, systematic error

component of measurement error that in replicate measurements remains constant or varies in a predictable manner

NOTE 1 A reference quantity value for a systematic measurement error is a true quantity value, or a measured quantity value of a measurement standard of negligible measurement uncertainty, or a conventional quantity value.

NOTE 2 Systematic measurement error, and its causes, can be known or unknown. A correction can be applied to compensate for a known systematic measurement error.

NOTE 3 Systematic measurement error equals measurement error minus random measurement error.

2.18 measurement bias

bias

estimate of a systematic measurement error

ISO 5725-1: the difference between the expectation of the test results and an accepted reference value
NOTE: Bias is the total systematic error as contrasted to random error. There may be one or more systematic error components contributing to the bias.

2.19 random measurement error

random error of measurement, random error

component of measurement error that in replicate measurements varies in an unpredictable manner

NOTE 1 A reference quantity value for a random measurement error is the average that would ensue from an infinite number of replicate measurements of the same measurand.

NOTE 2 Random measurement errors of a set of replicate measurements form a distribution that can be summarized by its expectation, which is generally assumed to be zero, and its variance.

NOTE 3 Random measurement error equals measurement error minus systematic measurement error.

2.20 repeatability condition of measurement

repeatability condition

condition of measurement, out of a set of conditions that includes the same measurement procedure, same operators, same measuring system, same operating conditions and same location, and replicate measurements on the same or similar objects over a short period of time

NOTE 1 A condition of measurement is a repeatability condition only with respect to a specified set of repeatability conditions.

NOTE 2 In chemistry, the term “intra-serial precision condition of measurement” is sometimes used to designate this concept.

ISO 5725-1: Conditions where independent test results are obtained with the same method on identical test items in the same laboratory by the same operator using the same equipment within short intervals of time

2.21 measurement repeatability

repeatability

measurement precision under a set of repeatability conditions of measurement

ISO 5725-1: precision under repeatability conditions

*ISO 5725-1: **Repeatability standard deviation**: The standard deviation of test results obtained under repeatability conditions*

*ISO 5725-1: **Repeatability limit**: The value less than or equal to which the absolute difference between two test results obtained under repeatability conditions may be expected to be with a probability of 95%*

2.24 reproducibility condition of measurement

reproducibility condition

condition of measurement, out of a set of conditions that includes different locations, operators, measuring systems, and replicate measurements on the same or similar objects

NOTE 1 The different measuring systems may use different measurement procedures.

NOTE 2 A specification should give the conditions changed and unchanged, to the extent practical.

ISO 5725-1: Conditions where independent test results are obtained with the same method on identical test items in different laboratories with different operators using different equipment

2.25 measurement reproducibility

reproducibility

measurement precision under reproducibility conditions of measurement

ISO 5725-1: precision under reproducibility conditions

*ISO 5725-1: **Reproducibility standard deviation**: The standard deviation of test results obtained under reproducibility conditions.*

*ISO 5725-1: **Reproducibility limit**: The value less than or equal to which the absolute difference between two test results obtained under reproducibility conditions may be expected to be with a probability of 95%.*

***outlier** (from ISO 5725-1, not defined in the VIM Vocabulary)*

a member of a set of values which is inconsistent with the other members of that set.

NOTE: ISO 5725-2 specifies the statistical tests and the significance level to be used to identify outliers in trueness and precision experiments.

2.26 measurement uncertainty

uncertainty of measurement, uncertainty

non-negative parameter characterizing the dispersion of the quantity values being attributed to a measurand, based on the information used

NOTE 1 Measurement uncertainty includes components arising from systematic effects, such as components associated with corrections and the assigned quantity values of measurement standards, as well as the definitional uncertainty. Sometimes estimated

systematic effects are not corrected for but, instead, associated measurement uncertainty components are incorporated.

NOTE 2 The parameter may be, for example, a standard deviation called standard measurement uncertainty (or a specified multiple of it), or the half-width of an interval, having a stated coverage probability.

NOTE 3 Measurement uncertainty comprises, in general, many components. Some of these may be evaluated by Type A evaluation of measurement uncertainty from the statistical distribution of the quantity values from series of measurements and can be characterized by standard deviations. The other components, which may be evaluated by Type B evaluation of measurement uncertainty, can also be characterized by standard deviations, evaluated from probability density functions based on experience or other information.

NOTE 4 In general, for a given set of information, it is understood that the measurement uncertainty is associated with a stated quantity value attributed to the measurand. A modification of this value results in a modification of the associated uncertainty.

2.30 standard measurement uncertainty

standard uncertainty of measurement, standard uncertainty

measurement uncertainty expressed as a standard deviation

2.39 calibration

operation that, under specified conditions, in a first step, establishes a relation between the quantity values with measurement uncertainties provided by measurement standards and corresponding indications with associated measurement uncertainties and, in a second step, uses this information to establish a relation for obtaining a measurement result from an indication

NOTE 1 A calibration may be expressed by a statement, calibration function, calibration diagram, calibration curve, or calibration table. In some cases, it may consist of an additive or multiplicative correction of the indication with associated measurement uncertainty.

NOTE 2 Calibration should not be confused with adjustment of a measuring system, often mistakenly called “self-calibration”, nor with verification of calibration.

2.41 metrological traceability

property of a measurement result whereby the result can be related to a reference through a documented unbroken chain of calibrations, each contributing to the measurement uncertainty

NOTE 1 For this definition, a ‘reference’ can be a definition of a measurement unit through its practical realization, or a measurement procedure including the measurement unit for a non-ordinal quantity, or a measurement standard.

NOTE 2 Metrological traceability requires an established calibration hierarchy.

NOTE 5 Metrological traceability of a measurement result does not ensure that the measurement uncertainty is adequate for a given purpose or that there is an absence of mistakes.

NOTE 6 A comparison between two measurement standards may be viewed as a calibration if the comparison is used to check and, if necessary, correct the quantity value and measurement uncertainty attributed to one of the measurement standards.

NOTE 8 The abbreviated term “traceability” is sometimes used to mean ‘metrological traceability’ as well as other concepts, such as ‘sample traceability’ or ‘document traceability’ or ‘instrument traceability’ or ‘material traceability’, where the history (“trace”) of an item is meant. Therefore, the full term of “metrological traceability” is preferred if there is any risk of confusion.

2.45 validation

verification, where the specified requirements are adequate for an intended use

EXAMPLE A measurement procedure, ordinarily used for the measurement of mass concentration of nitrogen in water, may be validated also for measurement of mass concentration of nitrogen in human serum.

4 Properties of measuring devices

4.7 measuring interval

working interval

set of values of quantities of the same kind that can be measured by a given measuring instrument or measuring system with specified instrumental measurement uncertainty, under defined conditions

NOTE 1 In some fields, the term is “measuring range” or “measurement range”.

NOTE 2 The lower limit of a measuring interval should not be confused with detection limit.

4.18 detection limit

limit of detection

measured quantity value, obtained by a given measurement procedure, for which the probability of falsely claiming the absence of a component in a material is β, given a probability α of falsely claiming its presence

NOTE 1 IUPAC recommends default values for β and α equal to 0.05.

NOTE 2 The abbreviation LOD is sometimes used.

NOTE 3 The term “sensitivity” is discouraged for ‘detection limit’.

4.31 calibration curve

expression of the relation between indication and corresponding measured quantity value

NOTE A calibration curve expresses a one-to-one relation that does not supply a measurement result as it bears no information about the measurement uncertainty.

5 Measurement standards

5.1 measurement standard

etalon

realization of the definition of a given quantity, with stated quantity value and associated measurement uncertainty, used as a reference

EXAMPLE 1 kg mass measurement standard with an associated standard measurement uncertainty of 3 μg.

NOTE 1 A "realization of the definition of a given quantity" can be provided by a measuring system, a material measure, or a reference material.

NOTE 2 A measurement standard is frequently used as a reference in establishing measured quantity values and associated measurement uncertainties for other quantities of the same kind, thereby establishing metrological traceability through calibration of other measurement standards, measuring instruments, or measuring systems.

NOTE 3 The term "realization" is used here in the most general meaning. It denotes three procedures of "realization". The first one consists in the physical realization of the measurement unit from its definition and its realization sensu stricto. The second, termed "reproduction", consists not in realizing the measurement unit from its definition but in setting up a highly reproducible measurement standard based on a physical phenomenon, as it happens, e.g. in case of use of frequency-stabilized lasers to establish a measurement standard for the metre, of the Josephson effect for the volt or of the quantum Hall effect for the ohm. The third procedure consists in adopting a material measure as a measurement standard. It occurs in the case of the measurement standard of 1 kg.

NOTE 4 A standard measurement uncertainty associated with a measurement standard is always a component of the combined standard measurement uncertainty(see GUM:1995, 2.3.4) in a measurement result obtained using the measurement standard. Frequently, this component is small compared with other components of the combined standard measurement uncertainty.

NOTE 5 Quantity value and measurement uncertainty must be determined at the time when the measurement standard is used.

NOTE 6 Several quantities of the same kind or of different kinds may be realized in one device which is commonly also called a measurement standard.

NOTE 7 The word "embodiment" is sometimes used in the English language instead of "realization".

NOTE 8 In science and technology, the English word "standard" is used with at least two different meanings: as a specification, technical recommendation, or similar normative document (in French "norme") and as a measurement standard (in French "étalon"). This Vocabulary is concerned solely with the second meaning.

NOTE 9 The term "measurement standard" is sometimes used to denote other metrological tools, e.g. 'software measurement standard' (see ISO 5436-2).

5.13 reference material

RM

material, sufficiently homogeneous and stable with reference to specified properties, which has been established to be fit for its intended use in measurement or in examination of nominal properties

NOTE 1 Examination of a nominal property provides a nominal property value and associated uncertainty. This uncertainty is not a measurement uncertainty.

NOTE 2 Reference materials with or without assigned quantity values can be used for measurement precision control whereas only reference materials with assigned quantity values can be used for calibration or measurement trueness control.

NOTE 3 'Reference material' comprises materials embodying quantities as well as nominal properties.

EXAMPLE 1 fish tissue containing a stated mass fraction of a dioxin, used as a calibrator.

EXAMPLE 2 colour chart indicating one or more specified colours;

NOTE 4 A reference material is sometimes incorporated into a specially fabricated device.

EXAMPLE 1 Glass of known optical density in a transmission filter holder.

NOTE 5 Some reference materials have assigned quantity values that are metrologically traceable to a measurement unit outside a system of units. Such materials include vaccines to which International Units (IU) have been assigned by the World Health Organization.

NOTE 6 In a given measurement, a given reference material can only be used for either calibration or quality assurance.

NOTE 7 The specifications of a reference material should include its material traceability, indicating its origin and processing.

5.14 certified reference material

CRM

reference material, accompanied by documentation issued by an authoritative body and

providing one or more specified property values with associated uncertainties and traceabilities, using valid procedures

5.18 reference quantity value

reference value

quantity value used as a basis for comparison with values of quantities of the same kind

NOTE 1 A reference quantity value can be a true quantity value of a measurand, in which case it is unknown, or a conventional quantity value, in which case it is known.

NOTE 2 A reference quantity value with associated measurement uncertainty is usually provided with reference to

a) a material, e.g. a certified reference material,

b) a device, e.g. a stabilized laser,

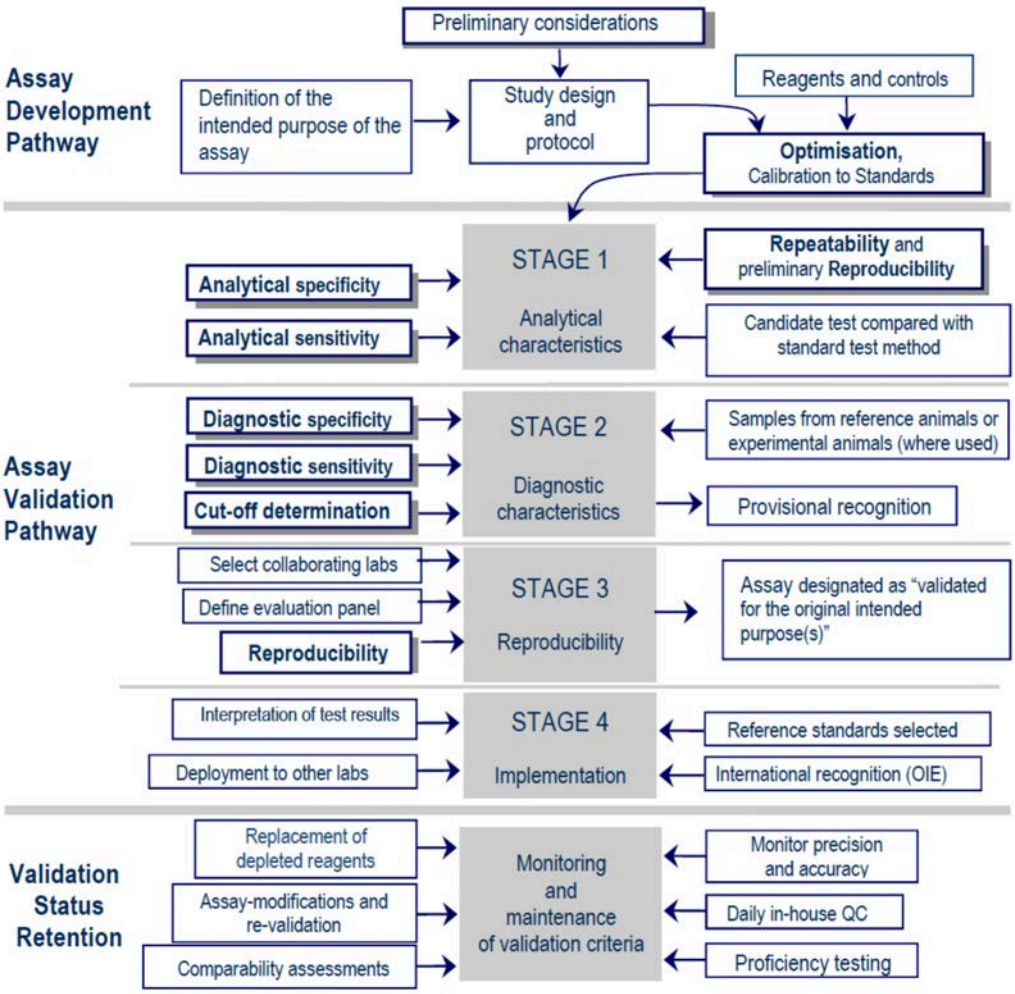
c) a reference measurement procedure,

d) a comparison of measurement standards.

Disease Testing Terminology

The OIE[3] Terrestrial Manual Glossary contains a figure particular relevance to our work and this repeated as Figure 1. It deals with assay development and validation for infectious diseases extracted from the Terrestrial Manual (page 4 Chapter 1.1.5).

Figure 1. The assay development and validation pathways with assay validation criteria highlighted in bold typescript within shadowed boxes.



Reference: Macintosh HD:Users:bww:Data:Wickham Ltd:Customers:ICAR:ICAR SC WG TF:Groups:Task Forces:Accuracy:Appendix 2 Terminology.docx

[3] World Organisation for Animal Health – www.oie.int.