Update on ICAR Reference Laboratory Network

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Summary

A policy for quality assurance on milk recording analysis has been developed from fourteen years by ICAR according to the orientation proposed in Ottawa in 1994. So called analytical quality assurance system has been based on the adoption and use by laboratories of same technical guidelines produced by ICAR and a structuring model based on national networks for laboratory monitoring at country levels and an international network of reference laboratories as the corner stone of a system which allows to anchor countries a common international reference. Objectives, organisation and stage of implementation and development are presented.

***Key words**: Milk recording analysis, Quality assurance system, Reference laboratory network.*

History

A policy for analytical quality assurance (AQA) was introduced at the 29th ICAR Session in Ottawa in 1994 that should cover every aspect of milk recording analysis and can provide confidence to stakeholders, ensure equivalence of genetic evaluation and enable analytical system recognition between countries.

That policy was handled by the Working Group on Milk Testing Laboratories and from 2006 continued by the new Sub-Committee on Milk Analysis.

From 1994 the working group has defined essential guidelines so as to assure a minimum precision in milk recording analysis provided the recommendations are applied and, from 1996, created a network of expert laboratories expected to become the basis of an international analytical quality assurance system for milk recording, called ICAR Reference Laboratory Network.

The international reference laboratory network has become an essential piece of the AQA system aiming at analytical harmonisation as its members are entrusted to be intermediaries between national levels and the international level where optimum methods and practices are defined (IDF/ISO guides and standards, ICAR Guidelines) to transmit adequate information to milk testing laboratories.

Structure and architecture

The international network constitutes a structure through which, thanks to interlaboratory studies, it becomes possible to provide an international anchorage to routine laboratories and estimating overall accuracy of milk recording measurement and absolute measurement uncertainty in individual laboratories.

This is realised through two levels of network implementation (possibly three), national (or regional) and international. The national reference laboratories operate as bridges for precision traceability between both national and international levels where interlaboratory studies are carried out respectively. A third layer can exist for instance in federal countries where as well regions can organise labs in network or could be developed in the future for on-farm analysis in the prospect of possible sub-network monitored by regional laboratories.

Membership

This makes that any laboratory commissioned to monitor routine testing laboratories should be invited by their national organisation to join the network. For specific situation where only few laboratories with no national co-ordination, individual routine laboratories may also join the network so as to benefit to a direct anchorage to the international level whereas, in well structured local situations, so-called reference laboratories can establish the junction between routine labs and the international level.

Competence and expertise requested as eligibility criteria to belong to the network are one or more of the followings:

1. National ring test organizer
2. Information on analytical methods
3. Reference Material supplier
4. Evaluation of analytical methods/instruments
5. Master laboratory for centralized calibration
6. Research on analytical methods
7. Teaching and training in laboratory techniques
8. National regulatory control of DHI analyses

The ideal situation being where the reference laboratory covers every competence item and therefore can ensure consistency and continuity in missions to routine laboratories.

Evolution

The numbers of laboratories qualified for various scientific/technical mission have increased gradually from 1996 to 2003, with its membership raised up to 38 members and since then it keeps stable about 38. In mid 2008 there are 38 of 32 countries involved in cow milk analysis, of which as well 16 work for goat milk and 14 for sheep milk.

Meanwhile the number of declared eligibility criteria continues to increase thus showing a qualitative development of the network towards maturity. In 2008, 75% of competence items realised by 34% of members, and 50% by 63% (Table 1).

Table 1. Numbers and proportions of eligibility criteria of network members in 2008.

Criteria number N	Proportion %	Lab number with N	Lab % with N	Lab number with at least N	Lab % with at least N
8	100	5	13	5	13
7	88	4	11	9	24
6	75	4	11	13	34
5	63	4	11	17	45
4	50	7	18	24	63
3	38	3	8	27	71
2	25	2	5	29	76
1	13	4	11	33	87
0	0	5	13	38	100

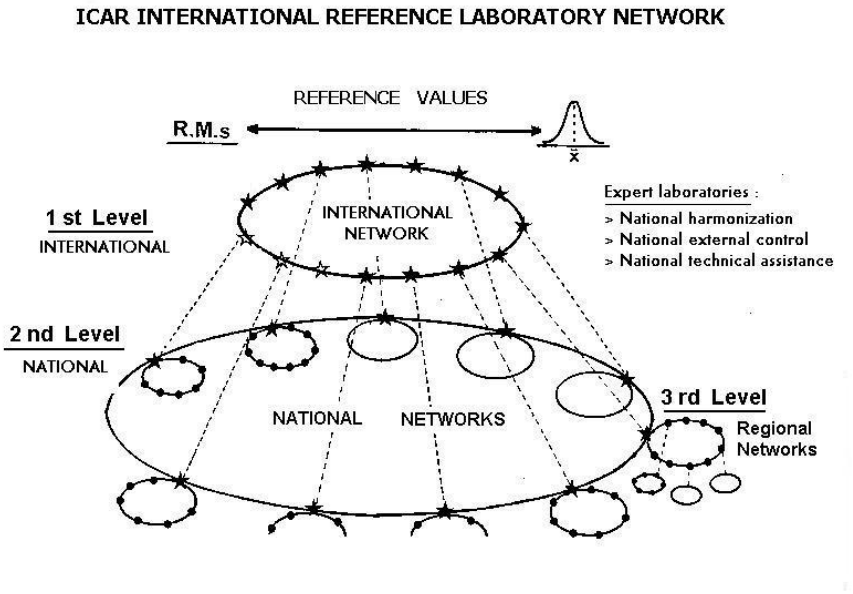

Figure 1. Architecture of ICAR Reference Laboratory Network.

Interlaboratory proficiency studies

Since 1996 an annual interlaboratory proficiency scheme has been regularly run twice a year for methods used as reference to calibrate routine methods for fat, protein and lactose in cow milk. It was complemented from 1999 with methods for methods for urea and somatic cell counting. In 2008 participant number is stable with about 20 for fat, 21 for protein, 1 for lactose, 15 for urea and 21 for SCC.

Significant improvement of analytical performances has been noted and today the overall precision observed within the network appears better than that of respective method standards thereby brings proofs of the efficiency of the scheme.

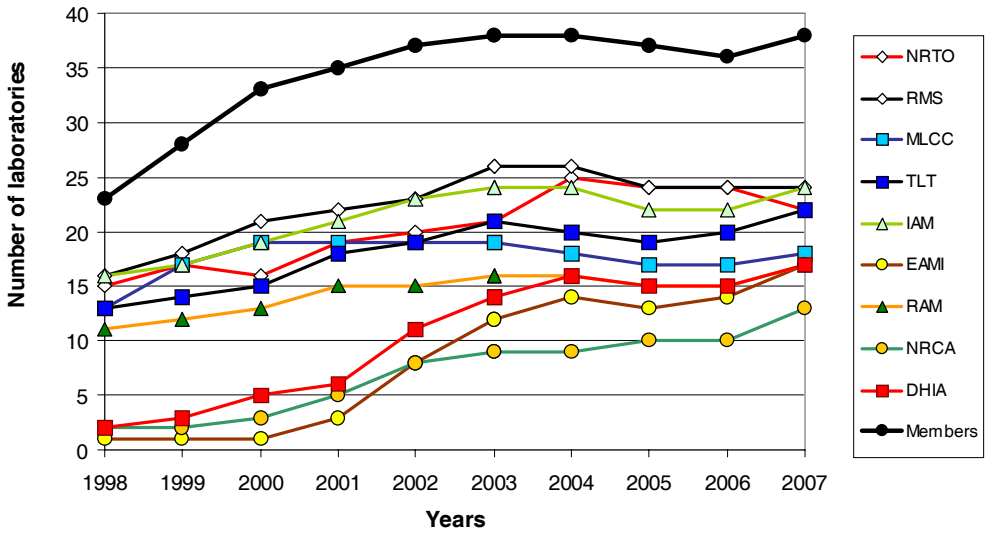

Figure 2. Evolution of ICAR Reference Laboratory Network membership from 1998.

Stage of progress in AQA implementation with the network

The end of the first phase of implementation of the network was stated in ICAR Session in Kuopio 2006 and the launching of a second phase declared. As the general frame and architecture has been drawn and established time has come to feed the system with installing sustainable operations and activities for the benefit of harmonisation in ICAR member countries.

Proper models are to be given through guidelines to organise proficiency studies at national levels adequate for calibration purposes, define methodologies to orient and implement centralised calibration, evaluate analytical precision traceability, establish the international anchoring thanks to ICAR Reference Laboratory Network.

Beside education and training for laboratory practitioners should be promoted through the network with regard to analytical methods for milk and the respective former items and implemented at national levels based on international guidelines and standards.

Conclusion

The AQA system launched by ICAR in 1996 has already shown efficiency at the network member level. The analytical quality of national level remains under the responsibility of network members to which appropriate tools and guidance should be brought and developed where missing. The work has been undertaken by the Sub-Committee on Milk Analysis since 2006.