## Perspective

- **Fat-tail** is a unique **adaptive trait** found in indigenous sheep in Ethiopia whose genetic basis remains poorly understood.
- How animals will respond to altered temperatures and precipitation patterns under projected changes to climate depends largely on the genetic architecture of traits that are responsible for mediating local adaptation to current climate conditions.

Approach

- Using genome-wide 50K SNP genotypes, we determined the genetic basis of fat-tail in Ethiopian sheep using 3 selection signature approaches, hapFLK, ZFst and Rsb
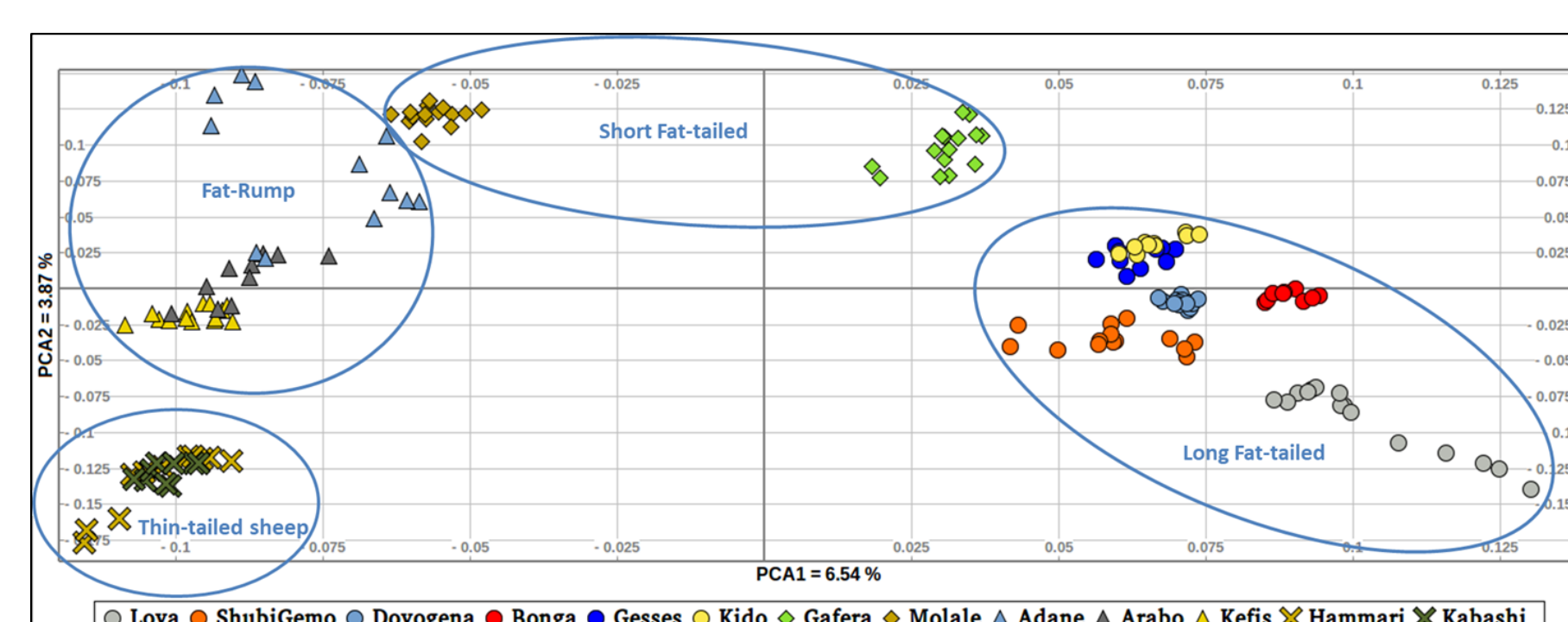
Sheep cluster based on their tail phenotypes

ENVIRONMENTAL SUSTAINABILITY
Living within planetary boundaries

Mapping genomic regions and genes associated with the fat-tail, an adaptation trait in indigenous sheep

- Candidate regions associated with fat deposition and body temperature regulation identified
- Aim is to understand adaptation mechanisms that enable sheep to cope with feed, water and temperature stress

RESEARCH PROGRAM ON Livestock

CGIAR

Joram M. Mwacharo, ICARDA
j.mwacharo@cgiar.org

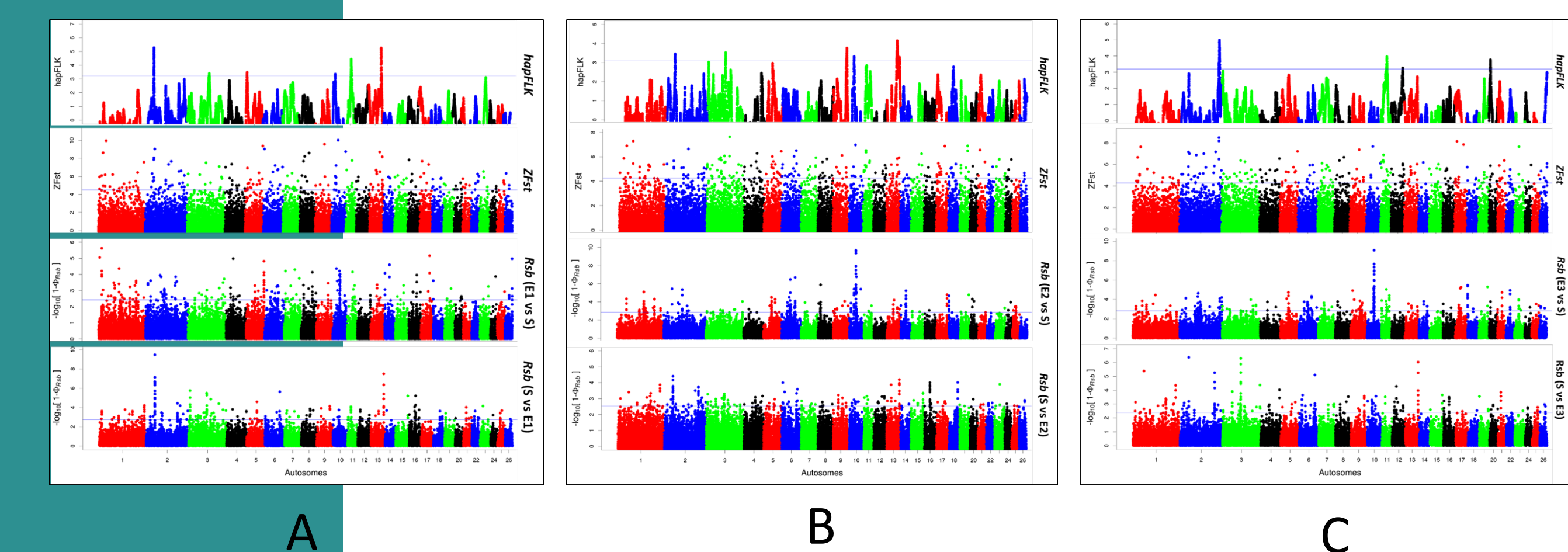**Olivier Hanotte, ILRI**
o.hanotte@cgiar.org

Main findings

Eight candidate regions identified spanning genes associated with:

- Fat deposition (*NPR2*, *HINT2*, *SPAG8*),
- Skeleton structure and development (*ALX4*, *HOXB13*)
- Body temperature regulation (*TRPM8*)

Selection profiles between Ethiopian fat-rump (A), long fat-tail (B) and short fat-tail (C) sheep *vis a vis* thin tailed sheep

Future steps

Identify causative mutations associated with the candidate genes

Partners

Debre Birhan Research Centre (DBRC), Ethiopia; Amhara Regional Agricultural Research Institute (ARARI), Ethiopia; University of Nottingham, UK

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