In this article, the authors discuss the potential of Video Image Analysis (VIA) and Computerised Tomography (CT) on live animals and carcasses in beef and sheep production. The main aims of the complex project are:

- Investigation of the usefulness of VIA methods on live animals and carcasses (beef and sheep) for predicting carcass quality
- Estimation of genetic parameters of VIA traits

### Background

Efficiency of the whole red meat chain is reduced by the lack of objective, practical and accurate measurements of carcass quality. Video Image Analysis (VIA) on live animals and/or their carcasses may provide consistent and accurate measures of carcass composition in the abattoir. In addition, online VIA information may be used for breeding purposes. Research is necessary to test and calibrate the VIA technology under conditions relevant for Scotland’s beef and sheep production.

### Aims and Objectives

The main aims of the complex project are:

- Investigation of the usefulness of VIA methods on live animals and carcasses (beef and sheep) for predicting carcass quality
- Estimation of genetic parameters of VIA traits

### Policy Relevance

**Beef cattle & sheep production**

- ~40% of economical Scottish Agricultural output
- beef - largest sector of Scottish agriculture (~1 m cattle, ~30% of UK breeding cows)
- sheep - most common Scottish farming activity (31% of holdings). Scotland has > 20% of the UK breeding flock

Both these livestock sectors have a major impact on:

- the sustainability of Scotland’s rural economies
- the nature of Scotland’s unique landscapes
- the biodiversity of Scotland’s natural habitats
- UK & international marketing of Scotland’s high quality beef and lamb

### Efficiency/profitability of the red meat chain needs:

- vertical integration allowing quality assurance, carcass feedback for optimizing management and breeding
- improved Value Based Marketing Systems (VBMS) of carcass quality for which VIA may be of high importance

### Relevance to Cross-Cutting Themes

| CCT 1: Responding to Climate Change | ★ ★
| CCT 2: Protecting Biodiversity | ★ ★ ★
| CCT 3: Environmental, Social and Economic Sustainability of Rural Scotland | ★ ★ ★ ★

### Material and Methods

#### VIA and CT SHEEP

- Use of VIA/CT on live sheep:
  - Live weight, muscle and fat weights predicted with high accuracy
  - Intramuscular fat (IMF) predicted with moderate to high accuracy
  - Breed differences in prediction accuracy of muscle, fat, IMF and bone
  -Optimal image locations have been identified

#### VIA CATTLE

- Use of VIA on live beef cattle:
  - Initial results confirm that VIA cameras mounted above the water trough can take suitable VIA images
  - Dimensional and area measurement of live beef cattle can be derived from these VIA images for predictive purposes
  - This live beef cattle VIA work is being continued as part of a Feasibility LINK programme

### Progress to Date

#### SHEEP CARCASSES

- VIA system is a fast and non-invasive method to predict weights of carcass joints with high accuracy and precision
- Preliminary results show that carcass composition can be extracted successfully from images taken in the abattoir

#### CATTLE CARCASSES

- Genetic parameters of VIA traits (e.g. loin $h^2 = 0.26$) suggest potential for use of VIA in breeding programmes
- Estimates of fatness by VIA show reasonable correlation with subjective EUROP grid fat grade ($R^2 = 0.52$)

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