Innovations for Hillside Farming

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Hillside farming (HSF) has many faces
Grassland production system as an example

Multifunctional mountain farming – the link between production and landscape

(Source: Agroscope)
Challenges posed by the grassland production system

- Animal-husbandry/forage-crop production system
  - Forage conservation/storage for winter feeding
  - Transport from field to farmyard (distances, differences in altitude)
  - Greater transport volume (volume, weight)

- Forage quality
  - Management intensity – quality
  - Labour peaks – harvest opportunities

- Structures and topography
  - Slope gradient
  - Structure (farm and plot size, accessibility)

- Mechanisation and manual labour
From grass to feed – Mechanisation in difficult circumstances: Mowing

(Source: Agroscope)
Tedding
Windrowing: leaf blower or bound haymaker
Harvesting, transport and unloading: bulk transport
Harvesting, transport and unloading: Round bales
Manure application
Mowing on the slope: the critical process

Legend
- 25 % of the measured values
- 50 % of the measured values
- 25 % of the measured values
- Median: Value in the middle of the series of numbers

TSL: Tractor with self-loading waggon
TP: Transporter

Source: Fabio Noto and Joachim Sauter, 2006
Working-time requirement (LUh/ha)

Source: Fabio Noto and Joachim Sauter, 2006
Hillside mechanisation: a challenge for engineering and farmers

- Demands made of hillside mechanisation
  - Performance and manoeuvrability
  - Safety (suitability for slopes – operating limits)
  - Protection of the soil
- Special machinery: small production runs, simple robust technology (use, maintenance, servicing)
- Different towing-vehicle concepts
  - Two-axle mower – light multipurpose tractor – transporter
  - Heavy multipurpose tractor and self-loading waggon (drive axle)
Rigitrac – an innovative tractor concept

‘Multipurpose tractor’

- Tractor chassis with central pivot: low centre of gravity, safety on the slope (front-mounted devices)
- Same wheel diameter front and back: no advance running – protects soil/tyres, saves energy
- All-wheel drive: safety, braking effect, climbing power
- All-wheel steering: manoeuvrability, soil protection
- Telescopic handler axles: no camber – flat wheel support (double wheel)

**Fields of application**

- Mowing, tedding, turning, slurry piping
- Towing tasks, wheel loader tasks
- Municipal use (winter road clearance)
Rigitrac – an innovative tractor concept:
Tractor chassis with central pivot:
low centre of gravity, safety on the slope

(Source: Rigitrac AG)
Strengths when mowing on a steep slope

(Source: Rigitrac AG)
Multifunctional use – Wheel loader/Municipal vehicle

(Source: Rigitrac AG)

Hayblower

Source: www.fuetterungstechnik.ch

Source: www.rapid.ch

Speed rake: Windrowing and loading

www.grundbichler.at
Future visions for HSF (II): Giving up the production function: looking after cultivated land, keeping landscape open, nature conservation areas

Schächental, Canton of Uri, Switzerland (Photo: Agroscope)
Future visions for HSF (II): Giving up the production function: looking after cultivated land, keeping landscape open, nature conservation areas

Source: www.landwirt.com

www.brielmaier.com
Future visions for HSF (II): Giving up the production function: looking after cultivated land, keeping landscape open, nature conservation areas

Autonomous mower

Source: www.badische-zeitung.de
Future visions for HSF (III):
Production alternatives: Extensive animal husbandry
Future visions for HSF (III): Production alternatives: Extensive animal husbandry

Source: Agroscope, C. Umstätter. 2014
Thank you for your attention!

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