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USAGE-NG

Up-skilling Agricultural Engineering Next Generation

Identifying smallholder farmers learning requirements for future challenges

Work Package n°: **2**
Activity n°: 2.2

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1 Executive Summary

Activity 2.2. was very broad to lay the conceptual thematic foundations for following activities. Its work consisted mainly in research, reporting, communication and networking. Particular focus was placed on the agricultural sector in South Tyrol.

2 Overview

The activities of this work package were conceptually important to fulfil the overall goals of the USAGE NG project. The activities addressed SMF (small and medium farmers) capacities to adapt to environmental changes and transformations in agri-food systems. Multiple research and networking have been carried out to get an accurate and timely picture of SMF technical requirements and skills, in order to develop learning materials that respond to these requests. Activity 2.2. addressed the general conceptual work that formed the basis of all WP's and activities of USAGE NG and undertook a broad range of activities from research, analysis, networking, conceptualization to dissemination. In a more focused sense, it sharpened the understanding of the institutional and professional environment in which SMF in mountain and hill areas operate.
Achieved results:

Understanding SMFs needs: Surveys conducted
Activity 2.2. searched to identify future challenges of the agricultural sector especially in mountainous regions, as South Tyrol, in the coming 5-10 years. For this end, surveys and interviews were conducted as well as statistical data analysed. This in-depth data helped to understand better smallholder farmers background and economic reasoning. The activity developed a first survey designed to identify training needs, that collected information on farm households, machinery possession, use and related safety measures. This survey had international outreach, thus was available in tree languages English, German and French.
The survey has been developed and published online. We had in total 61 responses from 3 countries. About 23% respondents defined themselves as SMF. Data has been evaluated and is being used in the publications mentioned below. Link to the survey on necessities of SMF (Bedürfnisse kleiner landwirtschaftlicher Betriebe (boku.ac.at)). This helped to understanding better the institutional and professional environment in which SMF in mountain and hill areas operate.
A second survey resulted almost by chance due to the collaboration with the Interreg project CEREALP, which benefited from the experiences of the first survey. The second survey was held among mountain farmers involved in cereal production in the one particular part of South Tyrol, Italy. This survey saw 28 responses, providing detailed insights into production conditions. The data is being used for ongoing and future publications.
Besides the surveys, 6 interviews were conducted with key stakeholders in South Tyrolian agricultural institutions as mentioned in point 4. Network of innovation.

Reports and scientific papers
The activity led to the production of reports and scientific articles on SMF's future challenges and subsequent learning requirements.
There are actually two scientific papers in the process as well as two reports:

a) Journal paper, working title "Smallholder Learning Perspectives on Digital Technologies for Sustainable Agricultural Transformation"

The scientific paper is dealing with educational needs for small and medium farmers (SMF) in mountain and hill areas. The paper analyzes the situation of SMF's especially with regard to learning needs and didactical strategies on digital technologies. The paper discusses the specific socio-economic background and resulting learning preferences.
The paper is not yet submitted to a journal but under revision by the authors.

b) Conference proceedings "Local perspectives on possible niche markets: The Mechanization of Cereal Production in Mountain Areas"

The paper discusses potentials of agricultural niche markets in mountain areas and evaluates, on a macro level, cereal cultivation in South Tyrol, Italy. Mountain farmers consider cereal cultivation a highly interesting diversification of the activities of the farm enterprises. The paper investigates preferred technologies and mechanized solutions. The paper has been submitted and is currently under review.

Design learning strategies and learning products
The analytical work described above together with the empirical results drawn from surveys and interviews allowed us to update learning strategies and learning products. These understandings were channelled into courses, exercises, lectures and other learning formats, was organized in WP4 and in activity 4.1. and 4.2. USAGE NG allowed us to deliberate on new ways of teaching at university and LLL level. Consequently, a transversal update on learning requirements and hybrid educational products could be realized in rather short time, which are eventually necessary for improving production and labour organization of SMFs.

Learning strategies for SME in mountain areas on specific topics:
- Digital technologies for agriculture
- diversify of production systems towards alternative value chains, e.g. cereal production on pastures and grass lands
- Machine and labour safety

Network of innovation and learning partners around SMF in South Tyrol
Over the period of the project, we have built and intensified our network of actors in agricultural sector in South Tirol and beyond. This network may be divided in two sections: Partner institutions with whom we directly interacted and partners with whom we got in general contact. Direct partner interaction allowed us to do expert interviews about relevant topics.
Partners with direct interaction and local encounters:
- Versuchszentrum Laimburg, South Tyrol,
- Südtiroler Bauernbund SBB, department further education
- Brink & Beratungsring – South Tyrolian mountain extension services
- Several visits to fairs of regional and international importance:
  - Agri-Automation Day

  - Agrialp
  - Interpoma
  - Agritechnica
  - Saatguttage
- Company and industry network: Geier srl, Ciccoria srl, Wanner Sprühgeräte GmbH and others
- Bürgergenossenschaft Obervinschgau, Mals
- Erlebniswelt Roggen Erschmatt, CH
- Naturpark Binntal und Roggenanbaugemeinschaft Oberwallis, CH
- unibz, third mission, studium generale

These partnerships brought us to direct interactions regarding better understanding SMF learning requirements.

Partners are mainly the same with whom we did activities 4.1. and 4.2. in WP4. Based on the network, we implement courses and learning events with innovative didactics for our target group SMF.

Non-direct partners from the region of South Tyrol:

- Fachschulen Südtirol
- Verein der Absolventen landwirtschaftlicher Schulen, A.L.S
- Arche Südtirol – Artenvielfaltshöfe
- Winterschule Ulten
- ASTAT (agricultural statistic office South Tyrol)

Further, we have extended national and international contacts, as well as contacts to the industry:

- Network with relevant partners in the EU and global institutions and constructers, agricultural machinery companies

Achieved Result for beneficiary module

Activity 2.2 delivered a empirical evidence base on the learning needs of smallholder and small- and medium-scale farmers (SMF) facing climate change, agrarian transition, and structural transformation of agri-food systems. The activity combined surveys, interviews, desk research, and networking to capture both current skill gaps and future competence requirements, with a particular focus on mountain and hill regions such as South Tyrol.

Two structured surveys were designed and implemented. The first, conducted internationally and available in three languages (EN/DE/FR), collected 61 responses from three countries and focused on farm structures, machinery use, safety, digitalisation levels, and training needs; approximately 23% of respondents identified as SMF. A second, region-specific survey carried out in cooperation with the Interreg project CEREALP gathered 28 responses from mountain farmers involved in cereal production in South Tyrol, providing detailed insights into production conditions, mechanisation constraints, and diversification strategies. In addition, six qualitative interviews with key regional stakeholders (advisory services, associations, and institutions) complemented the quantitative data.

The results identified priority learning needs in the areas of digital and smart farming technologies, machinery selection and safety, sensor-based monitoring, sustainable mechanisation, and data-informed decision-making. Strong demand was observed for practice-oriented, regionally adapted, and flexible learning formats, with clear preferences for

blended and modular approaches over purely online or static formats. The findings also highlighted structural constraints for SMF, including limited time availability, heterogeneous farm systems, and varying levels of digital readiness.

Activity 2.2 resulted in concrete outputs, including internal analytical reports and two scientific publications in progress or under review, addressing smallholder learning perspectives and local mechanisation needs in mountain agriculture. These results directly informed the design principles for subsequent module development (WP3), pilot courses (WP4), and mobile learning strategies (WP5), ensuring that later project outputs were grounded in validated needs and realistic learning conditions.

Overall, Activity 2.2 successfully translated farmers' perspectives into actionable educational requirements, strengthening the relevance, effectiveness, and target-group alignment of the USAGE-NG project.

3 Results/Indicators

Results are summarized in a set of indicators.

Quantitative Indicators

- Number of learners completing training 362 – 400
- Number of smallholder farmers and smallholder farmer organisations reached 8-12
- Total hours of lectures 41h
- Activities as part of courses, excursions, 2
- Number of laboratory exercises done 11
- Survey among participants regarding quality of training and information provided

Qualitative Indicators

- Perceived relevance to professional practice high
- Pedagogical quality and learner engagement good - high
- Inclusiveness (youth, women, low-qualified learners) high
- Transferability of learning materials good
- Indirect feedback good
- Further request and repetition of events high
- Ex-post evaluation by students and LLL good-very good
- Networking: Interactions with external partners: smallholder mechanization needs very high
- Satisfaction, sustainability, technical skill level after training etc. good - high
- High participation medium- good
- High quality of exercises high
- Training materials in person and mobile available in progress
- Positive evaluation of teaching and training offers high
- Synergies with other WPs, activities and external projects high