

RURACTIVE OPEN CALL - CHALLENGE 16

Title of the challenge	Improving beekeeping productivity and honey quality in high-altitude Zakarpattya
Dynamo (pilot location)	Zakarpattya, Ukraine
RDD (Rural Development Driver) <i>addressed by the challenge</i>	Sustainable agri-food systems and ecosystem management
Overall context description and specific context to be addressed by the challenge	<p>Mountainous beekeeping and honey production is a special type of rural economic activity in the Zakarpattya region of Ukraine, which differs from the flat landscape's beekeeping by difficult weather conditions, shorter honey production cycle, exposure of bees to different threats, such as diseases and pests. Mountainous beekeeping usually involves a special breed of bee: Carpathian bee (<i>Apis mellifera carpatica</i>), which is more productive in lower temperatures and with herbs with lower sugar level in pollen, which makes it especially important for local economic use.</p> <p>Beekeeping as a rural economic activity is challenged by several aspects:</p> <ol style="list-style-type: none"> 1. Beekeeping is done in a traditional way, without effective pest and disease control, often with over- or under-treatment of bee families. 2. Due to lack of information about performance and condition of bee families, productivity of honey production is not reaching its full potential. 3. Quality of honey is not controlled and people who purchase honey don't know the quality of the product.
Scope of the Challenge	<p>We are looking for solutions that would provide:</p> <ol style="list-style-type: none"> 1. Hive health monitoring and environmental monitoring: Effectiveness of beekeeping in terms of timely check and opportunity to react, also at the distance, to the conditions of life within the bee families: sanitary condition of beehive; prediction/timely indication of pests and diseases of bee families and reaction to it. 2. Increase of honey production productivity by collecting real-time data on critical factors like hive weight, humidity and temperature, etc. The aim is to provide tools that

	<p>support decisions on hive placement, feeding, etc., leading to higher honey yields.</p> <p>3. Tools and methods for quick check of honey quality: water level; sugar level; presence of added components/honey naturality or purity.</p> <p>All solutions should offer scalable, cost-effective, easy to use technologies that are tailored to and accessible by the local community. Solutions must be responsive to local climate and environmental conditions, protecting the local ecosystem and enhancing local biodiversity.</p>
Solution requirements	<ul style="list-style-type: none"> Monitoring technology for beekeepers and honey producers capable of tracking existing or expected condition and threats for bee families, needed reaction to such threats, suggest recommendations for increase of productivity of honey and bee products production and provide honey quality check. The solution needs to include a data analysis tool accompanying the monitoring technology as software or app. Usage training and installation support is expected. Honey quality testing tools for rapid honey testing, low cost, portable and user-friendly, suitable for use by small scale beekeepers without advanced laboratory equipment. We expect to have at least 10 sets of technical tools for beekeepers in case the solution includes sensors and RFID tags to test and ensure good results which can be shared to other participants at the market. Given the rural and mountainous environment of the Zakarpattia region, solutions must be portable, user-friendly, weather (humidity, precipitations, heat, cold) resistant and suitable for use directly in the field. The solution should be easy to use and low-cost, ensure open access, and utilise open data sources.
Specific objectives and expected outcomes	<ul style="list-style-type: none"> To increase the effectiveness of beekeeping in the mountainous areas of Zakarpattia region through the adoption of advanced monitoring technologies. To promote beekeeping as an economic activity in the remote mountainous rural areas, supporting local communities, fostering local traditional activities and ways of living. To increase productivity and effectiveness of honey and other bee products production. To establish quality check of honey at the local honey market, assuring consumers have access to high quality products.

	<ul style="list-style-type: none">• Preservation of biodiversity and of local breed of bees.
Available resources	<ul style="list-style-type: none">• Information and local data on beekeeping available.• Network of beekeepers, available to test the solution.