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INNOGROW
Interreg Europe

POLICY BRIEF *1*

TECHNOLOGICAL INNOVATION &
RURAL SMES



SUMMARY

This policy brief presents 12 new technologies conducive to innovative growth through facilitation of access to new markets, creation of new jobs and increased profitability. These technologies, as well as their enablers and barriers, were identified upon analysis of data input from the INNOGROW project partners and are presented here along with selected cases of good practice regarding technological innovation in the context of rural economies. The rationale behind this is to furnish public authorities and rural development managing authorities with up to date evidence on the role of technological innovation in rural economic activity and concrete recommendations on how to diversify incentives for rural SMEs to adopt innovative solutions in the various stages of production, product distribution and quality control.

How is technological innovation a key growth enabler for rural SMEs?

Job generation

SMEs operating in the primary sector (agriculture, forestry, animal husbandry and aquaculture), and in the tertiary sector (tourism and others), occupying 10-49 personnel, are more likely to increase the number of job positions as a result of adopting a new technology.

Access to new markets

Rural economy SMEs occupying less than 10 operating in the fields of agriculture, forestry, animal husbandry and aquaculture industries, as well as SMEs of 50-250 employees operating in the tourism sector, were found to have increased potential of accession to new markets upon adoption of an innovative technology.

Increase in profitability

Rural enterprises of less than 10 employees or 50-250 employ have shown a comparative potential of increasing profitability through the adoption of new technologies.

HOW?

- ✓ Diversify funding sources
- ✓ Secure technology & Innovation-specific funds
- ✓ Reduce time needed for funding
- ✓ Address bureaucratic conundrums
- ✓ Promote vertical and horizontal collaboration between rural firms

INNOVATIVE PRODUCTION TECHNOLOGIES

ORGANIC FARMING

A sustainable alternative to conventional agriculture increasing soil fertility and biological diversity. Sales of organic food worldwide is steadily on the rise. Organic technologies and machinery, e.g. mechanical weed removers equipped with arm cameras that will identify weeds in need of removal, gradually offer farmers the capacity to increase production quality and access markets that value organic products. Farmers need support to adopt organic farming methods and technologies because transition periods are characterized by increased investment costs and levels of uncertainty.



- **Impact/benefits:** crop resistance, lower production costs & premium sales prices, energy efficiency & soil erosion protection
- **Barriers:** limited financial resources, weather-dependency of mechanical weed control, accessing markets of premium consumers, higher labor costs

RENEWABLE ENERGY

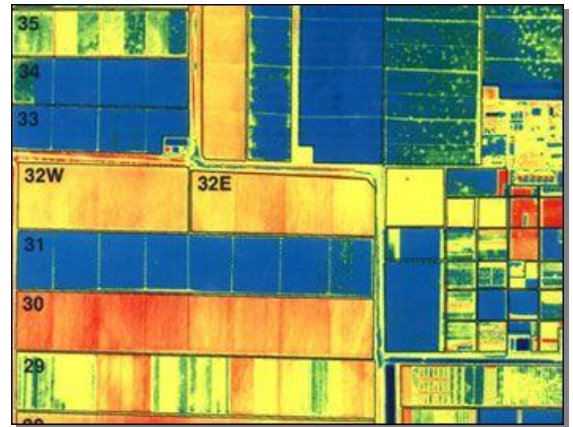


Energy from naturally replenished resources. Due to high and volatile energy costs (e.g. fossil fuels import costs) for rural firms, competition with non-rural firms is often uneven. Renewable energy technological solutions address precisely such limitations. Examples of renewable energy technologies include photovoltaic systems, solar air conditioning and water heating. Investment costs are significant and current transitions to renewable energy could be facilitated by coordinated efforts of building institutional and technical capacities. Renewable energy solutions are suitable as long term investments allowing:

- **Impact/benefits :** stable operating costs, reduced environmental impact, revenue generation
- **Barriers:** access to investment & financing capital, interests' conflict, lack of technical expertise & capacity building programs, lack of coordinating agencies

PRECISION AGRICULTURE

Precision agriculture is a farming management system based on observing, measuring and responding to variability in crops, aiming to optimize returns on inputs, while preserving resources. Innovative commercial precision farming techniques include the use of smart-meters (to measure temperature, humidity, atmospheric pressure, soil temperature, soil moisture, leaf wetness etc.), robotics in dairying, measurement of water usage, egg counting, bird weighing, better control of environment in poultry houses, computerised feed systems, climate control, automated disease detection and growth measurement. Depending on the technology used investments may vary from 200 – 40.000€.



- **Impact / Benefits:** Reduced pests' use, better monitoring and managing crop yields, improved competitiveness and increased income
- **Barriers:** complex precision agricultural systems dependencies (IT systems, data storage etc.), training & engaging farmers in own needs identification, lack of consulting opportunities, inadequate cost-benefit data, compatibility issues

CROP RESISTANCE SYSTEMS

Integrated pest management (IPM) systems and biological pest control techniques minimize crop losses and reduce environmental impact. Currently, IPM grown products are not identifiable and customers are not willing to pay premiums for these, except for specific environmental markets

- **Impact / Benefits:** better crop quality, long-term lower costs, access to specific markets, increased labor costs
- **Barriers:** Perceived high risks of technological adoption, lack of training & advice

NOVEL CROPS & FUNCTIONAL FOODS

Novel crops are unusual crops for specific end markets (e.g. fiber production, plastics, biofuels). Novel crops answer to many environmental pressures and offer energy resources' alternatives. Functional foods are related to health-promotion and are derived from natural foods for combination with other foods. (e.g probiotics in beverages).

- **Impact/ Benefits:** Higher value added products, new markets' access, average 25 % profit margin
- **Barriers:** Entry barriers & high production costs, supply requires precise specifications

TECHNOLOGIES SUPPORTING PRODUCTS' DISTRIBUTION

E-PLATFORMS FOR PRODUCTS' PROMOTION AND EXPORTS

Online platforms are market hubs bringing together in a digital space sellers, producers and importers enabling them to perform virtually any kind of commercial transaction. Rural SMEs with access to limited supply chains profit from online marketing and opportunities of involvement in international trade. However, to be able to yield the potential benefits from online trading, trade policy reforms are needed to ensure product distribution, as well as measures to protect SMEs from increased competition.

- **Impact / Benefits:** boundless market expansion, increased revenues, avoiding intermediaries and related costs
- **Barriers:** low levels of rural high-speed internet access, lack of coordination and funding for regional SMEs e-platforms, language barriers, inadequate secure payment facilities

ONLINE ORDERS AND DELIVERY TOOLS

Online orders and delivery tools are used nowadays by increasing numbers of customers. In 2014, 190 million Europeans were shopping online, but rural SMEs on the whole have been the least involved sector in e-commerce. E-commerce requires technical expertise and is usually outsourced by smaller SMEs to third parties.

- **Impact / Benefits:** expanded geographical reach and brand visibility, transactions' speed, lack of intermediaries
- **Barriers:** low levels of digital literacy, limited high-speed internet access, trust & credibility issues

FOOD TRACEABILITY AS MARKETING TOOL

Food traceability systems are systems that provide greater transparency and information to customers, enabling them to trace the route of businesses' products. In the EU, there are mandatory traceability rules for certain categories of food products. As a marketing tool and a factor of competitiveness in agribusiness, traceability increases the perceived product quality and safety. Products distributed in traceable local supply chains are found to be more appealing to many customers.

- **Impact / Benefits:** Traceability as a quality factor
- **Barriers:** lack of traceability operational requirements, lack of appropriate training

TECHNOLOGIES SUPPORTING PRODUCTS' SAFETY

SMART METERS AND INTERNET OF THINGS

Internet of Things involves the use of sensors, electronics, software, actuators and network connectivity to provide insightful data regarding operations of businesses through remote monitoring. IoT products and services will generate over 300 billion euros in 2020. Rural SMEs in agriculture, transportation and water distribution is expected to rise meteorically in the next few years.

- **Impact / Benefits:** cost efficiency, real-time data flow and remote control, energy efficiency
- **Barriers:** lack of training and interfaces suitable for inexperienced users, considerable monitoring infrastructure costs



TRACEABILITY AS A SUPPLY CHAIN MANAGEMENT TOOL

Systems that allow tracking of any food, feed, food-producing animal or substance intended for consumption, through all stages of production processing and distribution. Relevant technologies include barcodes, microcircuit cards, radio frequency tags, bio-coding, chemical markers, intelligent packaging, physiochemical and biological techniques. The EU General Food Law (2002) requires that food operators must be able to provide tracking information to competent authorities.

- **Impact / Benefits:** mitigating risks associated to unsafe products, reduces food losses, ensures compliance with market standards
- **Barriers:** costly commercial traceability software, lack of standardization, training/staff capacities & skills

SELECTIVE BREEDING PROCESSES

Selective breeding technologies are used to enhance the capacity for selectively developing particular traits in animals and plants. Alongside traditional selective breeding, novel methods such as in vitro fertilization or genetic engineering contribute to building resilience and adaptation (e.g. disease resistance, thermal tolerance etc.).

- **Impact / Benefits:** high-quality products, low input and maintenance costs
- **Barriers:** productivity risks, science & technology underinvestments

Quick facts

- ✓ SMEs can be engines for job generation. Process & product innovation in firms with 20 employees or more have a positive trend in job creation
- ✓ Diversified funding sources & investment strategies generate jobs
- ✓ 56% of rural SMEs improve their potential to access new markets after adopting a technological innovation
- ✓ 63% of rural firms increase profitability due to novel technology adoption
- ✓ Lack of funding constrains cash flow and hampers sustainable growth
- ✓ The European Commission supports personalized help & advice and the creation of business support organizations to boost competitiveness and productivity

Best Practice

Czech Republic: PROMIX – Crop Resistance

Proxim s.r.o is a Czech limited liability company, operating in the industry of chemical products manufacturing. For the last 20 years, Proxim manufactures and distributes chemicals for garden, household and industrial use. The company puts emphasis on reliability, quality and business partnership, which regularly results in the introduction of many new products in the market and innovations in its production and packaging. The constant objective of the company is to improve its market position and customers' perception. Promix aims at advancing its current position in the market to become the most reliable manufacturer and seller of high-quality and affordable chemicals. Towards this goal, in 2012 the company identified the **opportunity to access the agriculture market**, providing plant protection products that comply with the principles of integrated and organic farming. The idea resulted from the managers' interest in innovative products in crop resistance systems as an attempt to better satisfy their customers' needs, who are increasingly interested and looking for environmentally-friendly plant protection products against pests.

Proxim developed the EKOL Auxiliary plant protection product in 2012. EKOL is an adjuvant used to **increase the effectiveness of insecticide spray** against overwintering pests on fruit plants. The EKOL product is now an approved and registered product to be used not only for fruit plants, but also for ornamental wood and vine to protect them from overwintering pests. Important factors for the success of the product were the availability of internal capital from the firm and its owners, the well-identified need in the market, and the close collaboration with other businesses in the sector.

The **main barrier** encountered during the development of the innovative product was the difficulty and time needed to hire employees with the appropriate skills. Being specialized in treatment of water pool and pond water, existing employees did not have **adequate expertise** in the agriculture sector, plants protection and crop resistance.

The development of the EKOL product allowed Proxim to access a new market, that of organic agriculture, increasing its competitiveness and the number of customers. Positive impact was also noticed on the firm's **productivity, as well as on the products' overall quality.**

Transferability potential for the development of similar innovative crop resistance products by SMEs of the industry in different regions or countries, to respond to customers' needs for environmental-friendly products in crop resistance.

Policy Recommendations

Public authorities should provide meaningful incentives to SMEs to adopt new technologies. Effective financial incentives require diversified funding sources, low levels of bureaucratic procedures and the establishment of networks for the exchange of information and support networks offering consulting services. Rural Development authorities are advised to proceed to a stocktaking of rural SMEs regarding their needs and potential for innovation. Through collaborative action involving the research sector, authorities should contribute to planning and matching production needs with technological innovation solutions. A rural development coordinator exclusively tasked to develop, implement and monitor a plan of 'bottom up' action for innovative growth, is a fundamental step in this regard.

Access to supply chains is crucial for growth and technological innovation is a key enabler in this regard. Currently, e-commerce, online retail and international, decentralized trade present huge opportunities for rural SMEs. Simultaneously, production and quality monitoring of production is increasingly dependent on technologically innovative and evolving automatisms. Public authorities are thereby advised to establish digital literacy training schemes. Such training ought to be sector-specific, depending on the regions' predominant types of economic activity. Further, authorities are advised to set up regional entrepreneurship hubs to provide specialized knowledge, and facilitate know-how exchange.

Vertical and horizontal collaboration with other businesses facilitates economies of scale, access to new knowledge, skills and specialization not available inside the firm. Public authorities are advised to focus on very small rural SMEs of less than 10 employees and bigger firms of 50-250 employees.

