Review on Agriculture and Rural Development 2022 vol. 11 (1-2) ISSN 2677-0792
DOI: 10.14232/rard.2022.1-2.157-160

HOMELAND SECURITY AND PASTURE BASED FARMING

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ABSTRACT
Self-sufficient agriculture is a corner stone in national economy. Sustainability, low external-input technology and nature reservation are all parts of Agro-SMEs' (small and medium enterprises) activities. Building decision support database, introducing heat tolerant cultivars and breeds, directing farm products straight to the consumers and taking all the opportunities what space industry offers are all parts of secure food production. Hungarian Grassland Management Database is being built with national cooperation. Remote sensing and on farm data collection are used. Survey data set and decision support system help to evade forage- and supplement shortages, also protect short food chains from halting. Heat tolerant and low water-consuming animals could be a natural response to climate change and droughts. European small and medium stakeholders have serious concerns about MERCOSUR and Green Deal. Direct trade allows farmers to negotiate better prices with consumers and processors. Locally processed meat, milk and wool need to be integrated into national commercial activity. CubeSat technology is an economical solution to test new plant cultivars, materials or life support systems. Mini space labs are available for every farmers or small enterprises, therefore custom products can be developed.

Keywords: grassland cadaster; MERCOSUR; uniforms; farm to fork; space grass

INTRODUCTION

National food chains are mostly based on agricultural companies that also play the role of integrator. As the world's population continues to grow, intensification, integration and consolidation of agricultural land cannot be circumvented in any corner of the world. In the developed world, only 1-2% of the population is working at farm industry. In Hungary 5% of the population interested in agricultural production. Food industry is extremely efficient, even a single food-company could supply the whole country.

Applying Hungarian ingredients and relying on domestic operators are greatly increase food supply resilience. In case of special legal orders, import channels may be disrupted. During normal legal order military and civil food supply can be solved through domestic producers and factories. Critical situation can be evolved during special or wartime legal order, when import lines are closed and basic food supply became a matter of national security, next to water and energy. Packaging, frozen storage and warehouse logistics are highly centralized. This fragile system can be less vulnerable in a re-decentralized storage network.

Decision making and understanding market circulations are all parts of a farming business. Knowing forage availability, nutrient content and wholesaler price trends help to prepare holdings to plan ahead. Small scale innovations are also support the protective environment, where space industry can be the new "open range" for all farmers.

GRASSLAND MANAGEMENT DATABASE

Data collection is part of the modern agriculture. Policy making and subsidies are both based on reliable data sets. Precision crop farming is collecting soil data automatically, meteorological satellites are monitoring atmospheric conditions in real time. For pasture-based farming dry matter production on grasslands is a basic information. Cost effective sheep farming or 'hay-only' cattle business need good predictions for annual planning. Good practice in the United States is supported by a decision support service called 'Grass Cast' (NET1). Three prediction models follow up the last 40' years with precipitation history. Every week, during grazing season, receives a dry matter yield prediction to help farmers adjust their stocking rate. Similar model is under consideration in Hungary in contrast with nature reservation purposes. The Hungarian model applies labelling regarding utilization categories (pasture, hay field, meadow). The numeric system takes into account, water availability, previous utilization practice and soil fertility.

ADAPTIVE LIVESTOCK

There is a debate between livestock farmers and scientists, that light-hided cattle breeds tolerate better high temperature (BROWN-BRANDL ET AL., 2006; STEFLER ET AL., 2019). It is obvious that darker surface reflects less direct light, however there are doubts that diet-fibre (cellulose) content counts more (OROSZ, 2017; HALASZ ET AL., 2022).

Heat shock protein (HSP) analysis proved (MAROTI-AGOTS ET AL., 2011) that there is a positive correlation between heat tolerance and high HSP level. Hungarian Grey cattle preserved an atavistic allele, which can be related to the presence of significantly more HSP mRNA production. The higher mRNA levels correlated positively with the amount of heat stress proteins, which allows more flexible response for the animal. Hungarian Grey perfectly adapted to dry environments, due to double selection (high calf removal weight and heat tolerance) pressure.

METEOPATHY

Domestic animals and their productional level are highly depend from environmental factors. Relaxed animals have better appetite and easier to handle therefore good mood is priority on farms. Mood is related to high barometric-pressure (KELLER ET AL., 2005; HALASZ ET AL., 2016) as zeitgeber (external stimuli). Meteopathy (weather sensitivity) is wildly known in animal kingdom. Insects and birds' responses on weather fronts also have been examined (NOWINSZKY AND PUSKAS, 1996; GYURACZ AND PUSKAS, 1997; SOMOGYI ET AL., 2014). According to research results, smaller animals, with fragile homeostasis, are more sensitive to pre-front effects. Unstable atmospheric conditions (pressure, temperature, humidity, wind direction) are key drivers of the daily temperament.

WORLD TRADE DIFFICULTIES

Pit mining, soya beans, beef cattle and Mercedes. What is common in these that they are all connected to the MERCOSUR-EU agreement (NET 2). More than 20 years negotiations were about trading between Europe and Latin America. As business rules have changed regarding high value machinery in exchange raw materials (soya, coffee and ore), countries like Germany, France, Argentina and Brazil have changed their export-import strategies. European Union protects domestic market with high import custom refers to food quality and animal welfare. High level of inflation in South America doesn't let these countries to lift their economies from productional level to high-tech ground. Therefore, low labour and basic material costs are very attractive for wholesaler entities. In the near future, it is inevitable to decide, whether EU countries turn toward Green Deal and

not using their agricultural resources. The European consumer is aware of the food stuff origin and quality. Moreover, most European citizens tend to pay higher price for reliable food. Comforting thoughts versus cost effective food industry. "To be or not be" high quality, safe European food…

CUBE SAT CONCEPTS

Space is the final frontier in every perspective (WEINZIERL, 2018). Philosophically, scientifically and economically there is no further limit than the void. It is common that economists and physicists work together to predict and understand dynamics in economy. Limited resources force humankind to reach out for new unexplored territories. Asteroid mining or planet exploration are not in the distant future anymore. Constant economical growth ends at the edge of space, until inter-planetary (Earth-Moon-Mars) trade kicks in. It sounds science fiction but space industry investors look otherwise (NET 3).

Ordinary farmers, small businesses also have opportunities to take their part in space activities. In one hand they use different services (meteo, remote sensing, communication, traffic) but there is a cost-effective way to make one step further. Testing new cultivars (radiation-induced mutation) or new bio-products (space lettuce, space beer) for space dweller communities, there is an affordable platform in 1 unit size. CubeSats have small compartments with a size of 10 x 10 x 10 cm. This is not much but it is enough to test couple of seeds, DNA samples or a piece of electronics. The cost is questionable but a space-tested product sounds good on marketing level. Daily application is also conceivable if the farm holding plans ahead with a LEO (Low Earth Orbit) certified product. Educational purposes come to focus in precision agriculture too.

DISCUSSION

Current homeland security environment requires new doctrines including food security. Quick, efficient and cost-effective decision making (Grassland Management Database), flexible-adaptive breeds and cultivars, wider knowledge about atmospheric complexity (meteopathy), understanding econophysics (MERCOSUR, Green Deal) and applying every peace of modern technology (CubeSat) are all part of a resilient agro-sector in every level.

Futuristic ideas like building cube-sats from wood, keeping farm animals on orbit or planting trees on Mars sound costly and unnecessary nowadays. Economy and security however are irrational (NET 4). Sudden changes might happen in any time and farming sector has to be prepared.

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NET 2: https://ec.europa.eu/commission/presscorner/detail/en/IP_19_3396

NET 3: https://www.morganstanley.com/ideas/investing-in-space

NET 4: https://irrationallabs.com/blog/what-is-behavioral-economics/