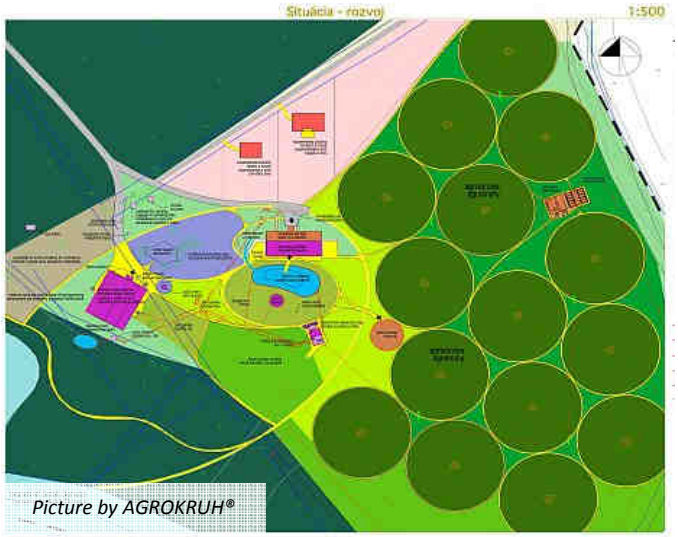
Introducing AGROKRUH: An effective system for sustainable growing and marketing of vegetables on a family farm

Sustainable agriculture means using methods with minimal negative effects on environment, production of healthy food, offering work possibilities to local population and cultivating the countryside. Perspectives for sustainable agriculture lie in direct relationships between farmers and consumers, which strengthen local economies and deepen mutual knowledge of each other.

AGROKRUH is a system developed especially for sustainable production of vegetables on a family farm. This sector is expected to grow, also in terms of profitability, in all countries of the Visegrad group as demand from the consumer side is still bigger than the current production capacity. For growing vegetables using AGROKRUH, you need neither a tractor nor other heavy machinery, which cause soil compaction. The whole system runs on electricity. In the past, as an experiment human and animal (donkey) powered generators were used. In the future, depending on the financial limitations, electricity could be possibly taken also from photovoltaics.



Picture by AGROKRUH®

The farm

The only concrete application of the AGROKRUH system was constructed thanks to the grant from TOYOTA in the years 2006-2007 in Slovakia. The land was offered to a farmer by one enthusiastic local community member. The construction costs of the whole system is about 60 000 € (with serial production the costs could be lowered, and the possibility to make the system self-supporting could further lower the price by at least a half). The farm is situated in the south-western Slovakia, near Small Danube river, next to the village Hrubý Šúr. The farm is designed to produce vegetables for about 60 families. It is a family farm economically profitable for one farmer family. It has been calculated that in Slovak conditions the costs of the technology investment (without the interests) would be paid off in 6 years. The farmer's debt is paid back to the community in healthy and cheap vegetables. The farm area is about 2 hectares. The sandy clay soil is fertile but after the conventional "tractor and agro-chemical" use it needs about 5-7 years for full revitalisation. In the AGROKRUH system the soil structure improves continuously because there is no soil compaction by heavy machinery. The local climate is optimal for growing vegetables, but the global climate changes bring extreme anomalies such as hailstones in the year 2010. Close to the growing area, a small irrigation lake was built with the capacity of 280 000 l of water, which is used for watering vegetables during dry summer periods. The family breeds also hens and ducks but only for its own needs.


Picture by D. Lešinský®

Technical characteristics of AGROKRUH

The system was deigned in the way that fulfils requirements for minimal energetic consumption for cultivation of different vegetables in optimal ecological, economical and social conditions. The example farm is divided into 15 round parcels

(circles), each one 36 m in diameter and the area of 1072 m^2 (see pictures). Altogether the circles are 1,6 hectares. The area of this size can be managed by one well skilled farmer with a seasonal help (e.g. from family members). Among these 15 circles there is "free" land of about 0,5 hectares altogether, which is used for planting different tea and spice herbs, flowers and flourishing weeds attracting many species of pollinating insects and natural predators for pests.


Picture by AGROKRUH®

Growing practices

In the year 2009, Mr Jan Šlinský, the inventor of the AGROKRUH system, succeeded to grow for sale more than 15 different kinds of vegetables and 5 spice herbs. In order to maintain high agro-biodiversity, the crop rotation on the farm is based on 48 different vegetable species, strawberries and facelia (*Phacelia tanacetifolia*) as well as up to 200 different herbal, flower and everlasting species growing in the "free" areas. All vegetables are grown from own seeds from the farm and seedlings are cultivated from early spring in the farm's own greenhouse. Neither artificial, chemical fertilizers nor pesticides are used but instead various green fertilizers, vermicompost and fertile teas from different herbs such as nettle (*Urtica dioica*). Weeding is done mechanically. Plant protection is based on a selection of resistant and tolerant varieties, ensuring optimal conditions for natural growth, crop rotation, and maximal agro-biodiversity on the field supporting biotopes for natural enemies. Planting season starts already in summer (a year before) with sowing of onion, than during autumn with planting of spinach and garlic, and in February in a greenhouse with rest of the vegetables.

The technology

AGROKRUH system is based on the iron frame used as a carrier unit for different instruments for soil preparing, seeding, watering etc. The frame is fixed in the middle of the circle, from where it takes electricity and water for irrigation. At the outer end there is a wheel moving the frame around and the electromotor with the input power of 0,75 kW. This combination allows to automatize various cultivation activities such as: spade/tillage, disintegration, sheeting, dragging the soil, fertilizing, watering, preparing the parcel for manual works etc. The mechanism is deigned for maximum of 12kWh electrical input for full operation of all machinery, but normally it is only about 5 kWh. Different implements and tools used in vegetable cultivation can be attached to the frame and are moved on the spiral. The frame can be easily moved to other circle after work is completed at a previous one. For the whole farm of 15 circles it is optimal to have 5 frames which can work simultaneously on different circles.


Picture by AGROKRUH®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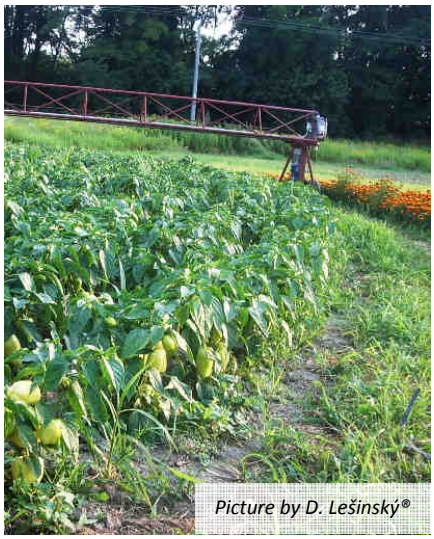
The AGROKRUH community: consumers


Picture by D. Lešinský®

The producer meets regularly (2-3 times a year) with members of the community, who, according to the agreement with the farmer, can visit the farm to see how vegetables are grown and help with different practices. In the year 2010, 533 persons registered in the system. The interest is 6 times higher than the current farm potential. Every member of the community prepares their own electronic "VEGEplan" and submits it before the end of January, so that the producer can see the interest and thus properly design the growing plan for next season. All members pay a small annual registration fee which allows them to be in the information system and to get up-to-date offers. During the season, there is a regular electronic ordering form available and next day in the afternoon the ordered vegetables are delivered to town in the form of "eco-boxes". In order to avoid complicated weekly dealings with money, each participating member who wants to order and receive vegetables prepays them in advance to the farmer. The prices of AGROKRUH vegetables for active members (members who participate financially in the creation of AGROKRUH farms) are the same as the prices of conventional products in a supermarket. For passive members there is an extra charge of 30%, however in the future it is planned to minimize the passive membership.


Picture by AGROKRUH®

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