

Valaha-tanya: a multifunctional agroforestry organic farm in Hungary

Source: Andrea Vityi and Balázs Kulcsár



Figure 1: Valaha-tanya farm. Credits: Andrea Vityi

In 2012 Balázs Kulcsár (an engineer) and Andrea Zorkóczy (an accountant) moved from the town of Érd to the outskirts of a village called Vértesacska in Hungary. They established a family farm on 12 hectares of land (Figure 1). The success of the farm is based on the combined application of agroforestry, permaculture and organic farming as well as the enthusiasm, technical and economic expertise of its owners. One difficulty they encountered in the development of their new farming activities was that previously the land was occupied by large fields of agricultural monocropping, and located in a hilly and windy area. Their land is still surrounded

by big, intensively cultivated agricultural parcels. More than ten years ago when they started to establish the family farm, there was very little information available so most of the practical solutions were based on their own ideas. Creating and operating the farm from their own resources, they have accumulated tremendous experience, which they are very pleased to share with anyone who is looking for a similar adventure.

Protective hedgerow and block compartmentation of the farm: purpose and management implications

The installation of the green protective hedgerow around the area was one of the first steps in the development of the farm (Figure 2). Due to this, within 4 years there has been a significant decrease in wind pressure, and most probably in chemicals as well.



Figure 2: Boundary hedge with a diversity of species (left) protects the orchard (right) and the whole farm (Photo: A. Vityi)

To further reduce the exposure and thus water loss to evaporation, the area has been sectioned in blocks with tree and bush lines planted perpendicular to the prevailing wind direction. Each fruit trees species was planted in a row or block to facilitate pollination. Within the orchard, a separate block is made up of a parcel of 12 rose species and several varieties of berry (raspberries, blackberries, red currant, currant gooseberry, chokeberries, mountain ash, cornel, elderberry and blackthorn). Flower petals are used for colouring and flavouring syrups. This structure also facilitates the management of the farm. In each block, animals are fed for short periods after

mowing, until the ripening of the fruits. In the south-facing area, the arrangement of crops in mixed parcels follows the contours. The area is dominated by orchards, but animal husbandry (goats, cattle for milk production, horses, donkeys and poultry) as well as vegetable and herb production are also carried out. Farm diversity is further enhanced by the recently planted wood pasture and forage areas, as well as the pine plantation with mixed species and multiple purposes. The orchard consists of commercial fruit and berry varieties as well as wild fruit species, approximately 1000 of each. The aim of this wide range of species and varieties is to increase biodiversity and to provide the flavour required for the main product of the farm: svrups.



Figure 3: The farmer harvests the black locust flowers in the hedgerow (Photo: B. Kulcsár)

The farm boundary hedgerow is also mixed species and very diverse. This diversity, in addition to the ecological benefits it confers, also serves to support the hedge's protective functions against environmental and human impacts (e.g. the growth of certain tree species has been adversely affected by chemical spray drift from adjacent fields). Among the timber species, black locust is the main stand-forming species in the hedgerow (Figure 3). Oak, beech, elm and flowering ash are the associate tree species. Appropriate protection is ensured by multilevel vegetation; in the shrub-layer, the lilac (*Syringa vulgaris*) and the elderflower (*Sambucus nigra*) are dominant. The lilac was chosen because it has a relatively dense deciduous crown, and it is a local tradition that lilac is planted along roads.

The farmer describes the hedgerow's multipurpose functions as follows:

- The flowers and berries of the trees and bushes are used in syrup production.
- It fully covers the fuel demand (90% of wood from pollarding, 10% of waste of summer pruning). The fuel is utilized in a biomass stove after chipping.
- A wide variety of species provides a diverse pasture rich in food attracting bees so the farmer produces more fruit from improved pollination services.
- The material from summer pruning and some of the fallen branches resulting from storm damage is used as a supplementary feed for animals.

Rotational pollarding of every second tree is carried out by the farmer (i.e. only one section of the hedge is pollarded at a time), to maintain the functions of the hedge (Figure 4). In the following four years the trees are allowed to develop until the next pollarding. The trunk is cut at three metres height then in following years only the branches are cut which can cause logistical issues. The pruning of the crown makes the trees grow more intensely, resulting in a denser crown and several new root-shoots. In this way, the hedgerow becomes thicker. Of course the root-suckers must be controlled outside the hedge.



It must also be ensured by removal of side branches that the branch height on the adjacent agricultural area of the protective belt is adequate to allow agricultural machinery to pass. For trees and bushes planted for flower and fruit production (e.g. elder) it is worth noting that the farmer has to leave a gap of at least two metres from the boundary for harvesting.

Wood pasture establishment and fodder production in the orchard

The reason for establishing wood pasture was that grazing in the orchard area (Figure 5) is limited and also causes some damage to the trees (mainly debarking by goats). According to the farmer's experience and testimony, the use of tree protectors is required (although, a disadvantage is that voles can squeeze under the net to shelter from predators). The presence of an experienced sheepdog is also important: the dog keeps the animals moving according to the farmer's instructions, so goats do not have time to rub the trunks and chew the bark. After the fall of the leaves, that in this region occurs in the second half of autumn, grazing is simpler, because there are no seductive leaves on the branches, but grass-grazing is still possible.



Figure 5: Intercropped orchard (Photo: Nóra Kiss Szigeti)

In the orchard area, mixed fodder is sown between the tree rows at a 6 m spacing (Figure 5). As long as the trees are not mature, the forage is providing the value of the parcels. An important observation is that compared to a single species crop, mixed fodder is more dense and results in a much higher yield, even without fertilisation. Using the same harvesting techniques, and with 4 cuts annually, the 3 hectare grass-legume forage mix produced a yield of 70-80 round bales of 120 cm diameter. Wilted and pre-wilted mixed fodder are fed to animals. When choosing the fodder seed mixture, it is important to include species that make the taste of the milk and cheese pleasant. If forage parcels get tired due to continuous mowing impacting on seed formation and natural rejuvenation (i.e. the feed loses its quality and no economically usable yield is produced), then the parcel is broken up, fertilized, re-fertilised and sown again. This rejuvenation is performed every 6-8 years.

As a major proportion of green fodder is produced in the orchard alleys, significant compaction of soil in the cultivation tracks occurs here. Agrotechnology has been designed to eliminate this compaction using a sub-soiler (without rotation) transferring organic material to the soil and providing a suitable seedbed for the growth of fodder crops. Due to the dry local conditions, fodder crops are mixed with oats. Feeding of animals is carried out only with roughage therefore, it is important to have a predictable and yearly constant feed quantity as well as continuous green cover in the orchards. This is achieved by the shifting of individual blocks (sowing of even and odd lines alternately) within the orchard, so that they are not exhausted at the same time. With this method, reseedling is required on ~ 10% of the area per year.

Managing biodiversity for increased production

Another advantage of the wide variety of species is the different flowering and harvesting periods, so that the period of raw material production can be prolonged. This has also been referred to as an advantage by other farmers from the AFINET project networks (RAINs), for example in Portugal, a country with very different climate conditions. This also allows the farmer to ensure manual labour stability, and logistics can be better organized. Wild fruit trees (eg. wild cherry, myrobalan plum, mulberry), naturally disseminated and regenerated, are kept as these species are well suited to the region's relatively dry climatic conditions, and this further expands the variety of flavours available for the syrups produced.

The conifer plantation with a mixed species composition is also multipurpose. Among others silver fir, common fir, spruce, black pine, larch, Scots pine and Himalayan pine are grown in this parcel. The Himalayan pine (*Pinus wallichiana*) improves the conditions for the development of other pine species due to the soil acidifying effect typically provided by conifers species, and also provides shelter in the farm. The chipped material from tree prunings serves the purpose of soil improvement and acidification. This is the place for growing Christmas trees, blueberries and mushrooms (Figure 6). The bee colonies working as pollinators are also located in the pine forest.



Figure 6: Rich harvest of mushrooms in the pine plantation (Photo: B. Kulcsár)

Arable plots

In the arable plots the farmer grows oats which are stored in bales for animal feeding. After the summer harvest, the farmer over-seeded with tillage radish and fodder rape, followed by a green fodder mixture in the following spring. After the autumn sowing, he could harvest oat-green fodder mixture in January, which is a strange phenomenon in continental climate (Figure 7). It can be freshly cut and fed to the animals, but if the temperature allows, the mixed fodder is baled in frozen state and remains fresh for 3 - 4 weeks. However, in winter, on non-frozen soil, light weight machinery is recommended for harvesting or waiting until the soil is frozen in order to prevent damage.



Figure 7: Oat ears in January (Photo: B. Kulcsár)

Since the planting structure and the combination of crops do not fit with conventional agricultural and horticultural technology, mechanization also requires some special solutions. The machinery used consists of a tractor, seed drill (ripper), disc harrow, cultivator, manure spreader, front mower, windrower and baler, but sometimes a horse is also used. The farmer explains that small and medium sized tools suitable for cultivating in the alleys are difficult to find and in many cases old machines are more reliable. For some operations, self-developed machines may be required.

Interesting links: www.valahatanya.hu