

Information on „Multifunctional Agroforestry Systems as Contribution to a Sustainable Agriculture and the Healing of Climate Damage“ with regard to the Negotiations on the EU's Common Agriculture Policy (GAP)

1. The Term: Multifunctional Agroforestry Systems and their Potential:

Multifunctional agroforestry systems consist of **2 main elements** as a **holistic solution**:

- 1. Vegetation** and especially tree vegetation brings extreme surface enlargement on the earth's surface for water cycles, for the evaporation and condensation of water to dampen the climate on the earth's surface, in the air and in the soil - and
- 2. Extremely high species diversity** brings **highest productivity** and **maximum stability** of ecosystems through synergies. **They serve mankind directly and indirectly** through various direct products and, in particular, through indirect products and services. For the good and rapid, Europe-wide (CAP) and worldwide implementation we need, the findings of
 1. tree vegetation and water cycles for the climate and
 2. great biodiversity for stability and productivity, and in addition
- 3. future-oriented and sustainable, holistic learning, didactics, communication** -> problem and conflict solving by
 1. knowledge- -> and
 2. experience- -> and thus also
 3. understanding learning - 1. curiosity-based, enjoyable, joyful, with heart, 2. with individual learning speed and 3. with all senses.

All significant results of agro-ecological research of the last decades, especially of the last years worldwide show:

Maximum stability and **highest productivity** can only be achieved through the extremely high species diversity of multifunctional agroforestry systems. This **solves problems** in the shortest possible time for **agriculture** and for the **economy**, for **society**, for the **environment** & for the **climate** - for **individual farms**, regions, countries, continents and **the entire earth**, especially for **desert regions** and **devastated soils**. Those systems are serving mankind **directly and indirectly** through the synergetic cultivation of diverse plants, especially perennial plants, on one area. The vertically more efficient use of cultivated land at different levels, above ground and in the soil, above and next to each other, locally with trees, bushes, shrubs, perennials, climbing plants and annual plants and their roots together with the various organisms living together with them in the ecosystem bring the **highest productivity**, local and regional supply (through short transport distances), security of supply independence, highest biodiversity - also through the increase in wild plants and wild animals - and thus **maximum stability**.

Multifunctional agroforestry systems create, also through a subdued climate, much more life-friendly living, learning and "work" spaces for all living creatures - including humans. This is achieved through considerably higher soil and air humidity, maximum evaporation and condensation surface of the trees and local water cycles (literature: Appendix 1). They often make the habitat between gaseous air and solid ground possible in the first place and enlarge it considerably.

The direct benefits consist of **products** such as nuts, fruit, (also perennial and winter) vegetables, medicinal & spice plants, fodder plants for animals and renewable raw materials such as wood, fibres, oils & fats and basic materials for the chemical industry, packaging, etc.

The **indirect services consist of products & especially services** also for people. Many, diverse cultivated plants provide indirect services with diverse wild plants, pets, (also hutable) wild animals, together with living creatures such as microorganisms, bacteria, fungi, worms, insects, birds, etc. that support each other. Small creatures dissolve minerals and trace elements from the rock as a building block for themselves and all other living beings. Some of them double every 20 minutes and thus also excrete twice the amount of nutrients for all other living things in the entire food chain. For example, they collect atmospheric nitrogen as a nutrient from the air, so that there is no further need for nitrogen in the ecosystem (nodular bacteria (*rhizobia*) or cell filamentous bacteria (e.g. *Frankia alni*) with papilionaceous plants, alders, broom, Elaeagnus, robinia, etc.). Domestic and wild animals, in numbers adapted to the habitat, distribute seeds, bacteria, frog and fish spawn, etc. Insects like bees pollinate plants. Ants divide and transport, among other things, dead plant parts. Various soil organisms, such as earthworms, bacteria, etc. convert these plant parts into nutrients. Plants together with other living organisms provide humans with information about the state of the ecosystem, e.g. with indicator plants. They loosen and clean the soil, water and air, also in cities or in the countryside. Through this cooperation and relationships plants enable and create their services. Only through this diversity and the manifold tasks of plants is it possible to preserve the cultivated natural landscape with these successes. This brings **maximum stability** and **highest productivity**. Optimal cultivation with harvesting, processing and marketing possibilities that already exist or can be easily modified maximizes productivity per square meter. This leads to a long-term increase in yield and value of the area, which is closely related to the original CO₂-binding natural planting. The scalability is also possible for large-scale cultivation. Tenants and owners have less effort and therefore lower costs; as the process of ripening and the associated energy input and the (possible) loss of topsoil and destruction of soil structure are also avoided.

2. In Times of Climate Change Multifunctional Agroforestry Systems can reach

- **additional stability and productivity**
- **in the agriculture, the economy, the society and the ecosystems**
- **in the climate on the earth's surface and our habitat**

This diversity and complexity provide the soil with better protection against erosion (soil, humus erosion, leaching, blowing out), man-made devastation, extreme weather, extreme temperatures, strong winds, fire and water. Covering the soil with plants (including mulch) provides protection against evaporation. Due to the extreme increase of the evaporation and condensation surface of the plants - especially the trees - the humidity between trees and humidity between the roots of the trees increases. This means that irrigation is not necessary. This also means that multifunctional agroforestry systems have much lower (forest) fire risk than monocultures and simple agroforestry systems. Humus formation creates a water reservoir,

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oxygen reservoir, nutrient reservoir and habitat for soil organisms (bacteria, soil fungi, mycorrhizae, worms, ...). Due to lower extreme temperatures in the ecosystem, the harvest becomes more stable and productive, thus significantly increasing food and supply security. At the same time carbon is bound with the humus build-up. Thus, agriculture is transformed from a CO₂ emitting to a CO₂-binding (CO₂ sink). The oxygen-releasing plants, together with nitrogen-binding microorganisms and mycorrhizae enrich soil life. The prerequisite for this is that the soil life is not heavily modified. This results in an increase in yield and value of the site. **Productivity and stability are increased:** The self-regulation of the system, through less external effort, leads to lower costs and builds up the habitat, also to the delight of beekeepers, hunters and conservationists. (Reduced biodiversity automatically means much less synergies and less self-regulation of the system, thus less fertile multifunctionality and much less stability and productivity)

3. Ways to get there

Until 12000 years ago, no crop in the world was cultivated with mainly annual plants.

Many **annual crops** such as cereals, rice, corn, potatoes (and cassava) are also very starchy. This readily available starch is converted into sugar in the human body and leads to considerable health problems (such as diabetes).

Perennial plants - the main component in multifunctional agroforestry systems - tend to have a higher mineral and trace element content due to their longer roots and thus serve to improve human health. Through the vertically more efficient use of the cultivated area and by increasing the area under cultivation through the greening of devastated areas with multifunctional agroforestry systems without additional irrigation, considerably more food can be produced with a tendency towards healthier quality. As a result, considerably more people can be fed and fed in a healthier quality than today. And this in a more environmentally friendly form. In multifunctional agroforestry systems without animal husbandry, farmers are free from daily supply obligations. Perennial plants reduce the effort required.

4. The request - also to the EU institutions

If multifunctional agroforestry systems are regarded by the **institutions in Europe** as "**permanent agricultural crops**", their **legal and subsidy status** will have been clarified.

To promote multifunctional agroforestry systems of greater diversity in the various categories of plants, which brings additional productivity and stability for the individual farm and society, can be regulated in a subcategory details of the support for this type of permanent crops. For the additional support and promotion of multifunctional agroforestry systems, future-oriented and sustainable, holistic learning, didactics, communication, also further education of all interest groups, stakeholders with all possibilities of modern media is possible and necessary. An adapted subsidy scheme to support the investment costs of setting up such systems is also essential. This way we do not lose any time. Here, through intensive cooperation between civil society and state administration, the goal can be easily achieved and learned from the ecosystem. Particularly among the challenges such as the **CoVid-19 pandemic**, forest gardens (literature: Annex 2), forest kindergartens, forest schools, forest universities, forest further education institutions and urban forest gardens (literature: Annex 3) offer new, resource-saving and community-promoting perspectives for all generations. Any alternative to multifunctional agroforestry systems is much more expensive (in the short, medium and long term), much less productive and much less stable for the farm as an individual, for the supply of the society as a whole and for the climate. Therefore, the promotion of non multifunctional approaches is not appropriate. An adapted subsidy scheme to support the investment costs of installing such systems is also target-oriented. With multifunctional agroforestry systems we will together achieve a large part of the **17 Sustainable Development Goals (SDGs) of the United Nations (UN) for 2030**, signed by all 193 countries, **by 2030**, if these criteria are taken into account in the detailed regulations.

Further information

1. innovative sustainable harvesting methods - including new, digital ones - can be used for the new management technologies, which create a potential for new jobs in rural areas.

2. according to current scientific knowledge, over 60% of the world's deserts are directly or indirectly man-made. Stone deserts can be revived with very little effort, without irrigation.

With 1. approx. **30 cm large dams** (+/-, depending on individual precipitation), **every 20 cm contour line**, 100% horizontal, subdivided, created with a simple spade (simple plough). Together with

2. targeted, diverse, diverse seeds & plantations, multifunctional, for people & ecosystem together new vegetation is created by infiltrating water and dew, and later also increased precipitation.

(The colonization of sandy deserts works somewhat differently, according to the same principles and mechanisms).

Here, too, it is always a matter of activating natural functioning system cycles.

Multifunctional agroforestry systems bring **hope and perspectives for future generations** and thus **counteract the rural exodus**.

Annex:

Annex 1 / Literature: Further information on **climate, tree vegetation and water cycles: waterparadigm.org**

Annex 2 / Literature: Further information on **biodiversity for stability and productivity** of (agricultural) agroforestry ecosystems 1998 - 2019: Prof. Dr. Martin S. Wolfe, (+), www.wakelyns.co.uk, also www.agroforestry.co.uk

Annex 3 / Literature: Federal Association of Nature and Forest Kindergartens in Germany www.bvnw.de/weltweit,