

The SEKEM Experience - Greening the Egyptian Desert through Sustainable Agriculture

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In 1977 I witnessed the foundation of the SEKEM initiative for sustainable development, building on nothing but Egyptian desert land and the vision and strong will of my father, Dr. Ibrahim Abouleish. Today, this vision has transformed into a strong and unique community, a foundation providing a wide range of e.g. educational and medical services lacking in the surrounding communities, as well as a group of successful, constantly innovating enterprises building their value chain on biologic-dynamic agriculture. And therefore, on the healthy and diverse ecosystems our work had established over time.

When we moved into the desert to set up a biodynamic farm, most people would not have believed that this is possible at all. Yet, some 33 years later we see that it can be as successful as to even sustain a living community with prospering cultural and social life. This would not have been possible without the diversity of plants and animals that we created, and that we depend upon. Whereas biodiversity in agriculture is still often perceived as a burden, for us, it was the only way to success, the way to create conditions in the former desert that support agricultural production and enable to sustain it over the long run. Today, the SEKEM main farm site serves as a habitat for more than 60 species of bird, both migrating and permanently settled, more than 90 varieties of trees and shrubs, and a broad range of small animals like hedgehogs, lizards, snakes, mongoose, and foxes.

All major religions share the idea that man is appointed as a steward on earth and has to sustain and develop it. In accordance to this approach, our governing principle is not to reduce our 'footprint' but rather to spread life and to contribute towards a better and healthier condition of the land, and the people, that we work with. This is the only way to create and sustain conditions for a planet with more than seven billion people.

All SEKEM institutions and activities are based on what lies at the very heart of the whole initiative: the transformation of the desert into fertile land, restoring and maintaining a healthy soil and biodiversity in nature. For SEKEM this is realized by applying solely organic and biodynamic agricultural methods as a comprehensive approach to the systems of life on earth, and as a unique way to vitalize the desert soil which comprises 95% of the Egyptian land area. Biodynamic agriculture utilizes the synergies of diverse and complex ecosystems, as well as the symbioses between plants and animals. Instead of degrading our natural environment by exploiting its resources, it enhances the health of our ecosystems and therefore, the vital services they provide.

In the specific surroundings of hostile desert climate and landscape, the first step to cultivation is to build a shelter from wind and the sand it carries by planting rows of fast-growing trees. Constant irrigation and further plantation then create a microclimate

suitable for human settlement, supporting agricultural cultivation and a broader diversity of natural flora and fauna. In sustainable agriculture, everything depends on fruitful soils - rich in nutrients and full of beneficial microorganisms, enabling high and stable yields. When we turn desert soil into fertile land the key to success is the application of bio-compost generated from organic waste materials. The compost contains the crucial nutrients, microorganisms and soil bacteria and simultaneously serves as soil conditioner, fertilizer, and a natural pesticide. Over the years, our cultivation system, characterized by compost application and continuous crop rotation, constantly improves the soils, increasing organic matter and soil biodiversity, and avoiding the depletion of any specific element.

For enhancing the productivity of the agro-ecosystem we work with, nature provides us with plenty of solutions which come almost free of charge and mostly with a variety of benefits. We strive to revitalize and adapt traditional agricultural knowledge to our specific geographic and climatic conditions, as well as to develop new and innovative solutions. This is necessarily a dynamic approach. There are no one-size-fits-all solutions; it is rather a process of constant learning and adjusting. To give some examples, in recent years we succeeded in re-cultivating healthy populations of the Egyptian indigenous bee species of *Apis mellifera lamarckii*, which had been weakened to the verge of extinction by pesticides, intensive cultivation and imported queens. To fight pests naturally started to breed and also sell predator insects to be kept in greenhouses to protect the crops. In cultivating grapes and fruit trees we have been successfully working with cover crops and synergetic pest control for years, and from a two-acre pilot of agro-forestry we are now rolling out on larger acreage this year, taking further advantage of the great synergies offered by nature. A compilation of selected crops, three and shrubs improves soil structure and is designed to make use of synergies between the species regarding nutrient availability and pest control. Rows of fruit trees within the fields provide shadow for tenuous herbs to blossom, which are in turn nurturing bees and predator insects. We also started grafting bio-dynamic seedlings, combining the strengths of two species to create productive and resistant food crops.

Yet, the largest potential lies in the careful selection of appropriate varieties, as it was already practiced by the ancient Egyptians. We have pioneered and supported systematic research on biodiversity in Egypt already more than two decades ago, networking with the international scientific community, and we strive to expand and share our knowledge. A Herbarium has been compiled for 25 years as a permanent record of the original flora of the area and in an effort to conserve endangered plants in Egypt. Local varieties of e.g. Chamomile, Fennel, Calendula, Basil, Roselle and Anis were selected for a quality-improvement program, resulting in quality and seed efficiency improvements by about 200%. SEKEM's long-term participation in the 'National Program for Genetic Resources' and the resulting collaboration in a gene bank, the engagement in the development of a 'National Strategy for conservation and sustainable use of wild medicinal plants in Egypt' with the Ministry of Environmental Affairs as well as the participation in and hosting of the 'Genetic Resources Policy Initiative' (GERPI Egypt) were all part of our efforts to secure biodiversity on the local and regional level.

Diversified cultivations are of course much more resilient against draughts, heavy rainfall or pests. While we can observe disastrous effects of these events on monocultures, biodynamic cultivations typically performs much better under stress. Thus, biodiversity is the best insurance against agricultural productivity risks.

However, in supporting and sustaining biodiversity, bio-dynamic agriculture enhances the vital services provided by healthy ecosystems in various ways, not only related to productivity. Our soils, and also our composting technique, not only create the basis for sustainable agriculture and food security, but also help to address climate change – another of the most pressing global challenges. The controlled microbial composting process applied drastically reduces GHG emissions, and generates certified Carbon Credits we use to offset any business flights as well as the SEKEM transportation fleet. And while most agricultural soils emit carbon dioxide and nitrous oxides due to unsustainable practices, we actually store carbon and thereby reduce atmospheric concentrations. In 2009, research was done on the soils we had been cultivating for 30 years and found that there had been absorbed 0.9 t C/ha every year on an average rate. Biodynamic agriculture has much higher sequestration levels than conventional methods and could eventually even turn the agricultural sector into a net absorber. In Egypt, water is the most precious resource and with a share in consumption of over 80% of course the agricultural sector is critical in developing solutions to face increasing scarcity. Biodynamic agriculture can contribute substantially to tackle this challenge by building active soils with high content of organic matter, with their proven strong positive effects on soil drainage and water-holding capacity. The SEKEM main farm is mainly irrigated from renewable ground water reservoirs feeding from a nearby Nile-water channel, and their level not being affected by our withdrawal. Yet, we constantly look for improvements in water management. Part of the irrigation water is taken from pre-treated waste water of our food processing facilities and the sewage system of the premises. In the past, we moved from traditional flood irrigation to sprinkler- and drip-irrigation and today, we are in the process of expanding the application of highly efficient sub-surface irrigation techniques.

Food security and poverty, climate change and water scarcity, as well as environmental degradation including dramatic biodiversity losses are among the most critical challenges we face in the 21st century. The way of agricultural production must obviously be regarded as a major link between all of these issues – and a more sustainable agricultural paradigm is the only system able to provide the holistic solutions we will need to survive in dignity, or maybe to survive at all.

Advocating sustainable agriculture, one has to face serious concern related to current higher prices and supposedly lower productivity in comparison to the prevailing conventional system. In this regard, I would like to point to the fact that there has been made ample scientific proof of high yields also in e.g. organic farming. And without taking due stewardship of the resources we depend on to feed our growing population, such as soil, water, and biodiversity, we will definitely not be able to keep up or increase the yields of conventional industrial farming. From this perspective, the typical question

of whether organic agriculture can really feed the world does not even require an answer – it will be the only way.

I would especially like to refer to the substantial externalization of true costs of conventional agriculture towards society at large. These well-known costs result from environmental degradation, as now being quantified for the aspect of biodiversity loss through the TEEB project, as well as from adverse effects on human health and well-being, not to mention misdirected governmental subsidies all over the world. I am strongly convinced that this will not be possible to be kept up, as water and energy prices will rise, and regulatory frameworks will have to be redesigned to ensure the sustainable competitiveness of nations. Therefore, over the short to medium term, organic agriculture will not only become cost-competitive with conventional products – it will be even cheaper.