Quasi-science prevents an environmentally friendly agriculture and forestry

European legislation in the field of genetic engineering is so narrow that it blocks the ability of researchers to take progress from publicly funded basic research on plants through to practical applications. We, 41 scientists who have received funding for basic research on plants from the Swedish Research Council, urge politicians and environmental groups to take the necessary steps to change the relevant legislation so that all available knowledge can be used to develop sustainable agricultural and forest industries.

One of the “Grand Challenges” facing mankind is to find ways to provide food, fuel and clean water to a burgeoning population using agricultural and forestry practices that are environmentally and economically sustainable. Research on plants has made tremendous progress and we now understand well how plants grow, how they protect themselves against disease and environmental stress and what factors limit production in agriculture and forestry. The prerequisite for progress has been basic research, especially studies of plant genes.

The application of this basic knowledge with the goal of making agriculture and forestry sustainable and environmentally friendly has been hindered by European gene technology legislation. These regulations impose very strict controls on the use of plant varieties developed by genetic engineering, while varieties developed via traditional breeding are released with no checks whatsoever. Some environmental groups leading opinion against GM plants criticise the use of genetic engineering by arguing that developments are linked to large multinational companies, that there is uncertainty about the risks, that they cannot be used in an agri-environment without increasing the use of chemicals and that only multinational companies benefit from GM plants. Let us examine these arguments.

Firstly: Genetic modification has revolutionized basic research on plants. For most of us; working in Swedish Universities with grants from the Swedish Research Council for basic research on processes such as photosynthesis, plant growth and biomass allocation, the function and role of plant hormones, the regulation of daily and annual growth rhythms, disease resistance and speciation etc., the use of GM plants is both standard practice and necessary. To draw clear conclusions requires that we are able to work with plants that demonstrate controlled changes in specified properties and such plants are produced more precisely and more quickly by genetic engineering than by traditional plant breeding. Thousands of GM plants are grown each day in Swedish universities.

Second: There is no scientific uncertainty on the issue of whether GM crops pose more risk to consumers or the environment than conventionally produced crops varieties. The legislation was formulated when there was not yet sufficient data on this but now we know better. 500 independent research groups have received 300 million € from the EU to study the risks. The conclusion in a summary of the results (“A decade of EU-funded GM research”) is that "GMOs are not *per se* more risky than conventional plant breeding technologies". We are basic research scientists and we know that the changes produced by genetic engineering are easier to control than those produced in other ways. The legislation argues the opposite, and imposes controls only on GM plants. To put this in other terms; the logic of the current legislation would suggest that only drugs produced by genetic engineering should be evaluated for side effects.

One of the main arguments against GM crops has been that varieties providing for a more sustainable agricultural sector have not yet been launched. The problem is that this is unlikely to happen with the current legislation. While plants resistant to disease - developed in the traditional way - can be grown at once, it takes many years to get a GM variety with the same properties approved for cultivation. The process from basic research - through applied research - to the finished seed marketed by a company is not only time consuming but also very expensive for GM crops: it costs an estimated minimum of 100 million SEK. Publicly funded researchers or small businesses will never have such resources and thus cannot translate advances made in basic research into a product for consumers. Only a few multinational companies are able to take these costs and therefore give the impression of a monopoly. The regulatory framework is contributing to the lack of competition and the appearance of monopolies; it is not simply patent rights or unsound business practices, as is often claimed.

The environmental movement's opposition to genetically modified plants runs counter not only to a transition to sustainable agriculture but also, paradoxically, to their "fight against the major chemical companies." The costs associated with the introduction of GM varieties give these companies a

monopoly on a huge market; 10% of the world's agricultural land is planted with GM crops today. In addition, companies that have as one part of their business the production of agrochemicals get "revenue insurance" from GM varieties because the use of GM crops often leads to a reduced demand for their agricultural chemicals.

Ultra-right religious groups in the U.S. are trying to raise a quasi-scientific version of creationism as an alternative to evolution. In Europe we look at this public debate with amazement, as if it went against the notion that the Earth is round. However, in Europe we have instead much quasi-scientific scaremongering about the risks of GMOs, and this is fuelled by some groups within the environmental movement. The Swedish environmental movement has a proud tradition of working from a sound scientific basis. For many of us, an early involvement in the non-profit environmental movement was an essential element in choosing our current careers; we wanted to contribute to a better world. The environmental movement should view it as a warning that many of us, with sadness, abandoned it when we felt we could no longer belong to organizations that sided with anti-science and populist forces – without subverting our scientific principles. We urge the Swedish environmental movement to unite with science and act as a rational, informed voice to influence their more vocal foreign counterparts.

Changing the genetic engineering legislation is not only a very important issue for Europe. Poorly funded plant breeding researchers and organisations in many third world countries are also being deprived of one of their best tools to provide better local crops because of the obvious risk of being excluded from the GM-hostile European market.

We therefore urge our politicians to change this outdated law. It should be the characteristics of a plant that determines whether it should be checked, not the technology used to produce it. We do not believe that all checks on the cultivation of GM plants should be removed. Varieties that are toxic or could cause allergies or environmental problems must be subjected to governmental control and independent evaluation - but these same controls should apply to ALL varieties, whether they are produced by genetic engineering or not.

Our desire is that the world's farmers will be offered seeds that have been developed to provide the most energy-and water-efficient and chemical-free agriculture and forestry as possible, but current genetic engineering legislation prevents this.

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